

MICHAEL ANTONOVICH

**Senior Vice President, Broadcast Services
PanAmSat Corporation
Greenwich, Connecticut USA**

Michael Antonovich serves as PanAmSat's senior vice president of broadcast services. In that position he is responsible for worldwide management of all PanAmSat "contribution" services to broadcasters, including special events, satellite news gathering, news exchange and program syndication services.

Since joining PanAmSat in March of 1989, Mr. Antonovich has been instrumental in the significant growth of the company's broadcast services department. He managed the company's coverage of what became some of its most successful events ever, including the 1996 Summer Olympic Games in Atlanta, the 1998 Winter Olympic Games in Nagano, and World Cup '98.

In over eight years with Group W Satellite Communications, Mr. Antonovich served in a variety of traffic, operations and engineering functions. His extensive experience in the broadcasting and satellite communications industries also included work with ESPN and the Satellite News Channel, where he acquired experience in broadcast production, post-production, operations and engineering.

Mr. Antonovich earned a Bachelor of Arts degree from Southern Connecticut State College, and a Master of Arts degree in communications from Fairfield University. He holds an FCC general class radiotelephone license and is a member of the Society of Broadcast Engineers and the Society of Satellite Professionals International.

Richard C. Barth

Biography

Richard Barth is Vice President and Director, Telecommunications Strategy and Regulation in Motorola's Corporate Government Relations Office in Washington, D.C. His responsibilities primarily involve developing and maintaining working relations with the U.S. Government's Executive Branch in order to facilitate Motorola's businesses worldwide. He manages a team that works closely with U.S. Government agencies, especially the Federal Communications Commission, that deal with spectrum and telecommunications regulatory issues.

Prior to his present position, Dr. Barth handled international trade and technology policy issues in Motorola's Washington office. Before that, he was on the National Security Council staff in the U.S. Executive Office of the President for over three years following a career that included various other trade- and technology-related positions in the Commerce and Treasury Departments.

Barth's doctorate is in inorganic chemistry and he is married, with two children, residing in the District of Columbia.

Caressa D. Bennet, Esq.
Counsel for the Rural Telecommunications Group
Principal, Bennet & Bennet, PLLC
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Education: North Carolina State University, B.A., *cum laude*, 1983; Columbus School of Law (Catholic University), J.D. 1987; *Catholic University Law Review*.

Ms. Bennet has practiced telecommunications law throughout the post-divestiture period. Since 1987, she has represented primarily rural telephone companies, cellular carriers, PCS providers, Local Multipoint Distribution Service licensees and CLECs before the FCC, state regulatory bodies, the courts and Congress. She is a nationally recognized expert on rural wireless and LMDS issues. She has operated her law practice, either individually or with her principals, since 1992.

Ms. Bennet is a regular speaker at industry trade shows and has published numerous articles on wireless and rural telecommunications issues. She is counsel for the Rural Telecommunications Group, a member of the Federal Communications Bar Association, Rural Cellular Association, Organization for Promotion and Advancement of Small Telephone Companies, National Telephone Cooperative Association, United States Telephone Association, Personal Communications Industry Association and American Bar Association.

Admissions: District of Columbia Bar; Pennsylvania Bar; U.S. Court of Appeals for the District of Columbia Circuit; U.S. Court of Appeals for the Sixth Circuit.

Peter Cramton is Professor of Economics at the University of Maryland, President of Market Design Inc., and Chairman of Spectrum Exchange. His research focuses on auctions, bargaining, and market exchange. Most of his recent work has addressed design and incentive questions in auctions and bargaining. He has served as an auction expert for numerous companies in spectrum auctions. He has advised the FCC and several foreign governments on the design and implementation of spectrum auctions. Cramton has designed electricity auctions in New England, and has advised bidders in electricity auctions. In e-commerce, he has led the design effort for several market makers developing business-to-business trading applications. Before joining the Maryland faculty in 1993, he was an Associate Professor at Yale University and a National Fellow at the Hoover Institution at Stanford University. He has published numerous articles on auction theory, auction practice, and bargaining in major journals. Cramton received his B.S. in Engineering from Cornell University and his Ph.D. in Business from Stanford University.

Mark E. Crosby
President and Chief Executive Officer

Industrial Telecommunications Association, Inc.
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Corporate Responsibilities

Mark E. Crosby serves as President and CEO of the Industrial Telecommunications Association, Inc., a position he has held since 1975. ITA is a national membership association that represents the interests of more than 3,000 organizations licensed by the FCC to own and operate dedicated private wireless communications facilities, which serve to promote operational productivity, competition and the safety and welfare of employees and the American Public. ITA also represents the communications interests of nearly 600 radio dealer organizations.

Mr. Crosby is also responsible for the representational and advocacy performance of the following industry organizations:

- ♦ Council of Independent Communication Suppliers, a national association comprised of 440 independent radio dealers and service organizations that sell and service private wireless communications infrastructure;
- ♦ USMSS, Inc., a national association comprised of 130 authorized Motorola Service Stations;
- ♦ Telephone Maintenance Frequency Advisory Committee, an FCC-certified frequency advisory committee for wireline and wireless telephone maintenance licensees; and
- ♦ Taxicab and Livery Communications Council, an organization whose members include for-hire taxicab and livery transportation companies.

Industry Responsibilities

- ♦ Secretary/Treasurer of the Land Mobile Communications Council, a non-profit organization dedicated to securing sufficient allocations of spectrum to meet the long-term requirements of all private land mobile radio users;

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- ◆ Member, Spectrum Planning and Policy Advisory Committee, National Telecommunications and Information Administration, Department of Commerce, which provides advice and guidance to the Federal Government on national radio frequency management issues and long-range spectrum-planning initiatives.

Education

University of Maryland, College Park, Maryland, BS Finance (1972)

United States Chamber of Commerce Institute for Organization Management, University of Delaware, Newark, Delaware (1980)

Professional Organizations

American Society of Association Executives

Federal Communications Bar Association

Radio Club of America (Fellow)

Awards

Person of the Year, Radio Resource Magazine, 1999



SHARON T. CROW

*Vice President, Bandwidth Markets
Williams Communications*

Sharon Crow is vice president, Bandwidth Markets, for Williams Communications Group (NYSE:WCG), spearheading Williams' effort into the bandwidth trading arena. Her responsibilities include formulating strategy and objectives, assembling a trading group comprised of individuals with trading acumen and telecommunications expertise, coordinating with all aspects of Williams Communications to enhance customer service, preserve premiere asset position and to ensure shareholder return.

Crow has nearly fifteen years experience in the energy industry, ten of which have been spent in energy trading. She began her career at Hadson Gas Systems in 1985 where she held various positions. She joined Endeveco, Inc., a natural gas gatherer and transport company, as the Manager of Transportation and Exchange. In 1990, she joined Louis Dreyfus Energy Corporation where her experience in trading began as part of their natural gas group, where she became one of three original basis traders in the natural gas industry. Crow was transferred to Louis Dreyfus Natural Gas Corporation to serve as the risk manager for their reserve portfolio. She joined Williams in 1995 as the director of natural gas for the eastern region of the United States, which encompassed all activities and inherited positions from the Transco merger. In 1998, she was promoted to vice president of merchant development which encompassed merger and acquisition activities in both natural gas and electricity.

Crow holds a bachelor of arts degree from the University of Oklahoma. She and her husband Brad and five children live in Tulsa, Oklahoma. Crow is active in many natural gas organizations.

MICHELE C. FARQUHAR

Michele C. Farquhar is a partner in the Washington law firm of Hogan & Hartson. She was chief of the FCC's Wireless Telecommunications Bureau, with primary responsibility for implementing the wireless-related provisions of the 1996 Telecommunications Act. Ms. Farquhar also served as Chief of Staff and Acting Deputy for the National Telecommunications and Information Administration (NTIA) at the Department of Commerce, and Vice President for Law and Regulatory Policy at the Cellular Telecommunications Industry Association (CTIA). She previously served as Senior Advisor to FCC Commissioner Ervin Duggan and as a special assistant to two FCC general counsels.

Laurence Green
Director, Strategy Unit
U.K. Radiocommunications Agency

Laurence Green is Head of the UK Radiocommunications Agency Strategy Unit. The Radiocommunications Agency, which is an 'executive agency' of the UK Department of Trade and Industry, is responsible for managing most non-military radio spectrum in the UK and for representing the UK in international discussions on radio matters. He has been closely involved in the development of policy on market-based spectrum management tools, including spectrum trading; the formulation and passage through Parliament of spectrum pricing legislation; and the subsequent implementation of spectrum pricing.

Prior to joining the Agency, he graduated in Natural Sciences from the University of Cambridge and worked in a range of policy posts in the Department of Trade and Industry.

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Thomas W. Hazlett

Resident Scholar



Research Areas	Telecommunications policy Property rights Antitrust policy in the information sector
Professional Experience	Professor, University of California at Davis, 1996-present Director of the Program on Telecommunications Policy, University of California at Davis 1993-present Visiting scholar, American Enterprise Institute, 1995-1996 Associate professor, University of California at Davis, 1990-1996 Chief economist, Federal Communications Commission, 1991-1992 Visiting scholar, Columbia University Graduate School of Business, 1990-1991 Citicorp/Wriston fellow, Manhattan Institute for Policy Research, 1990-1991 Assistant professor, University of California at Davis, 1984-1990
Books	<i>The Political Economy of Radio Spectrum Allocation</i> , forthcoming <i>Public Policy toward Cable Television: The Economics of Rate Controls</i> , coauthor, 1997
Articles	<i>Wall Street Journal</i> <i>Chicago Tribune</i> <i>Regulation</i> <i>The Economist</i> <i>New York Times</i> <i>New Republic</i> <i>The Public Interest</i> <i>Journal of Law and Economics</i> <i>Yale Journal on Regulation</i>
TV and Radio	NPR <i>Market Place</i> and <i>All Things Considered</i> KCET Los Angeles and KQED San Francisco (PBS affiliates) FOX News
Public Speaking	Has testified before the U.S. Senate Budget, Commerce, Science, and Transportation Committees Speaks and debates at universities and colleges nationwide
Education	Ph.D., economics, University of California at Los Angeles M.A., economics, University of California at Los Angeles B.A., California State University at Northridge
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Joseph Mitola III
Consulting Scientist
The MITRE Corporation

A consulting scientist with The MITRE Corporation, Mr. Mitola has been a principal architect of the migration of billions of dollars of legacy telecommunications and information processing systems to commercially based, software-programmable and highly interoperable open -architecture systems of the future. At present, Mr. Mitola is a doctoral candidate with The Royal Institute of Technology (KTH), Stockholm, Sweden, via MITRE's accelerated graduate degree program. His research interests include cognitive radio, the integration of intelligent agent technology into mobile wireless systems.

Mr. Mitola is internationally recognized as the "Godfather" of the software radio, having coined the term in 1991 to signal the shift in radio technology from digital radio with "80% hardware and 20% software" to radios in which 80% of the value-added of the radio is in the software. In addition to having published the first paper on software radios in 1992, Mr. Mitola writes and teaches internationally on this technology. He was guest editor of the May 1995 special issue of the IEEE Communications magazine on software radios and the February 1999 update, "The Globalization of the Software Radio." He was also the lead editor of the IEEE Journal on Selected Areas in Communications (JSAC) on the software radio (April 99). As lead editor of the IEEE Communications Magazine's series on Software and Digital Signal Processing in radio, he contributes to the joint commercial and military development of software radio technology and systems. He was elected as the first chair of the global Software-Defined Radio Forum in 1996, and continues to foster dual use, military-civilian, plug-and-play radio technology in that forum.

Prior to joining The MITRE Corporation in 1993, Mr. Mitola was the Chief Scientist of Electronic Systems, E-Systems Melpar Division, where he was responsible for research and technology development for advanced communications and electronic warfare systems for the US Department of Defense (DoD). He previously held positions of technical responsibility with Harris Corporation, Advanced Decision Systems, and ITT Corporation. He began his career as an engineering student assistant with the US DoD in 1967. He has been awarded the Bachelor of Science in Electrical Engineering degree from Northeastern University (Highest Honors), a Masters in Engineering degree from The Johns Hopkins University, and the Licentiate in Engineering from the Royal Institute of Technology (KTH).

MORGAN E. O'BRIEN

Mr. O'Brien, age 55, serves as Vice Chairman of Nextel Communications, Inc. (formerly Fleet Call, Inc.). He co-founded the company in 1987 and served as Chairman of the Board from 1987 to 1996. Mr. O'Brien had been with the firm of Jones, Day, Reavis & Pogue, an international law firm, from January 1986 to January 1990, where he served as partner-in-charge of the firm's telecommunications section.

Mr. O'Brien has extensive experience in mobile radio and is a leader in the SMR industry since its inception in the 1970's. He began his career as a lawyer with the Mobile Services Division of the Common Carrier Bureau of the Federal Communications Commission in 1970.

In 1972, he served as legal advisor for the FCC's Chicago regional experiment in spectrum management for land mobile services. By 1976, Mr. O'Brien was named Assistant Bureau Chief for Spectrum Management of the FCC's Private Radio Bureau and was responsible for authorizing the first licenses granted for SMR operation. He began then to appear as an industry expert at trade shows and has since published numerous articles about the SMR industry.

In private legal practice beginning in 1979, Mr. O'Brien represented major SMR operators in proceedings before the FCC. In 1982, he became counsel to several large applicants for cellular radio licenses.

Mr. O'Brien remains very active in the mobile radio industry. He is a frequent speaker at industry gatherings and is a recognized authority on all aspects of the SMR industry, including its regulatory environment.

Richard Reece

Dick Reece founded Red Bat Communications in 1995, and serves as President and director. In addition, Reece is a consultant with Diamond Technology Partners, where Red Bat is being incubated. His work at Diamond has primarily focused on developing strategies for and improving the operations of telecommunications companies. Diamond Technology Partners (Nasdaq: DTPI) is an e-business services firm that helps clients develop and implement Digital Strategy(SM) -- business strategies for the digital age. These digital strategies typically transform client business models and create dramatically different e-businesses that deliver sustained market leadership. Reece also spent three years working as a business development consultant for the GHK Company, a private company holding natural gas, oil, and international trading interests in the United States, China, Russia and Colombia. Reece received a Master's of Business Administration from the Wharton School, University of Pennsylvania, a MA from Johns Hopkins School of Advanced International Studies (SAIS), and a BA in Economics from Wesleyan University (CT).

ROBERT J. SHIVER

Robert Shiver is Chairman and Chief Executive Officer of Securicor Wireless Inc. (formerly Intek Global Corporation, which was publicly traded on NASDAQ). Mr. Shiver has held these positions since early 1997. Securicor Wireless specializes in the global wireless communication markets with research and development, manufacturing, distribution, and end-user operations throughout the world. Securicor Wireless corporate office is in New York City with offices in the UK, Asia and throughout North America. In September 1999, the former Intek Global was taken private by its largest shareholder, Securicor, plc and was renamed Securicor Wireless Inc.

Prior to joining Securicor Wireless, Mr. Shiver was the founder, a board member and Chief Executive Officer of Centennial Security Holdings, Inc., one of the largest providers of electronic security services throughout North America. Centennial was sold in August of 1997 to Protection One, a publicly-traded, majority-owned company of Western Resources.

During 1991-1994, Mr. Shiver was Chief Executive Officer and a board member of Senses International, which was a leading supplier of wireless products to the global security industry. Senses International, in addition to offices in the United States, had significant interest with the Ministry of Public Security in the Peoples Republic of China, as well as in other parts of the world. Senses International was subsequently sold.

From 1983-1991, Mr. Shiver worked with ADT Ltd. and held various positions, including Group Vice President with responsibilities for its various security and communication businesses.

Mr. Shiver currently resides in Morristown, New Jersey with his wife Cathy and three sons. Mr. Shiver is a member of Securicor Communication Ltd. Board of Directors, a member of the World Economic Council, a Board Member of AMTA (American Mobile Telecommunications Association), a Board Member of IMTA (International Mobile Telecommunications Association), also Vice Chairman of AMTA, a member of the Young Presidents Organization, and is a founding member of Project Acorn, which is a charity organization designed to assist underprivileged children.