



STEPHEN W. STETSON

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QUALIFICATIONS

- Experienced project manager in environmental studies and technology development.
- Satellite remote sensing specialist with more than twenty five years of experience.
- Innovative and proven approach to urban heat island analysis.
- Broad understanding of the synergy amongst environmental, economic and political concerns.

PROFESSIONAL EXPERIENCE

Managing Partner, Green Energy Biomass Partners (2009 – present)

- Developing the foundation for a biofuel industrial complex in Maine.

President and CEO, Global Environmental Management, Inc. (GEM), (2000 – present)

- 2006 – 2009 Directing research on the natural resources in the northeastern United States.
- 2005 – 2006 Supported risk management analysis of oil refinery explosions.
- 2004 – 2005 Member of the science team for the US Department of Homeland Security's Urban Dispersion Program for modeling the flow of airborne toxins through cities.
- 2003 – 2004 Mapped the Land Cover and Land Use conditions of more than six million acres surrounding Houston, Texas for an urban heat island and air quality study funded by the Federal and State Governments.
- 2000 & 2002 Signed two separate five-year research agreements with the National Aeronautics and Space Administration (NASA) to develop commercial applications for remote sensing technology related to urban heat island studies.

Founding Partner, Kodiak Satellite Imagery (KSI) (1997 – 2000)

- *KODIAK* Satellite Imagery was the first company to introduce 5-meter color enhanced satellite imagery to the forest industry in British Columbia, Canada. *KSI* developed products, services and solutions for private forest companies and the Provincial Forest Service of British Columbia. Solutions included 3-D fly-through visualization, forest cover classification, and information extraction from satellite imagery.

President and CEO, Systems for World Surveillance, Inc. (SWS) (1992 – 2000)

- Developed commercial applications for satellite imagery in areas such as thermal mapping, change detection, data fusion, and 3-D visualization. Provided remote sensing products and services; including consulting, data processing, training, and a technology brokerage service. Produced educational web site on satellite imagery at <http://www.RSAT.com>.
- Satellite Imagery Distributor for EOSAT, SPOT, Space Imaging, Digital Globe and foreign data sources. Provided satellite imagery and related data sets to clients worldwide.

Founder and President of SWS, Inc. (1981 – 1987)

- Pioneered the development of computer mapping and tracking systems with raster databases. Directed the research and development of digital mapping technology for integrated tracking, navigation and communication systems. Developed proprietary algorithms for automated feature extraction from scanned maps and aerial photographs for dynamic system interface. Consulted on systems development with U.S. and foreign Defense Departments.

HISTORY OF INNOVATIVE PROBLEM-SOLVING

2006 - Developed new approaches to digital image analysis to generate interactive content in video streams delivered over internet protocol networks. Key aspects of the new process involve feature extraction and database registration.

2004 – Developed a new analytical approach to problem solving and extracting information from multivariate data for an environmental study. The methodology was employed to develop new processes for a.) improving land use and land cover mapping, and b.) improving the quality of input parameters for atmospheric models.

2002 – Developed a process for measuring the potential energy savings in commercial and industrial facilities by integrating satellite imagery with energy models. The process is used to measure and verify the effectiveness of reflective roofing materials for reducing the absorption of solar energy through the building envelope and the subsequent demand on cooling energy.

1998 - A method for improving the efficiency and cost-savings of forest management activities in British Columbia, Canada was introduced and subsequently adopted by the Provincial Forest Service and private forest management firms. The method enhanced and integrated the use of three-dimensional, multi-resolution satellite image data sets for updating forest cut-block information, forest fire damage, and forest health assessment.

1994 – Developed a process for producing an intuitive, graphical representation of surface temperature distribution and anomalies in urban areas by integrating disparate data sets in a new way. Temperature ranges from satellite thermal data were pseudo-colored and fused with high resolution aerial imagery and land cover data to define local variations and causes of urban heat island conditions.

1982 – An innovative approach to generating electronic map databases for use in navigation, tracking and communications systems was developed and laid the foundation for future integrated mapping systems in the military and commercial markets more than a decade later. Digital noise-reduction algorithms were created to accelerate and automate the data production process following micron-level laser scans of paper maps and film negatives to create unprecedented raster image databases for multiple applications.

BUSINESS HIGHLIGHTS

Urban and Energy – 1992 - Present

- Mapped the surface properties and heat island conditions of Houston, Texas to produce land use and land cover maps and generate the input parameters for atmospheric modeling of the region;
- Mapped the surface properties of the urban heat island conditions of 1) New York City; 2) Tallahassee, Florida; and 3) Sacramento, California for the local energy companies and the American Public Power Association;
- Mapped the urban heat island conditions of Atlanta, Georgia for the US Environmental Protection Agency;
- Provided urban heat island maps of Washington, DC to the Department of Energy for their program on the energy conservation benefits of urban heat island mitigation.

Homeland Security – 2004 – 2005

- Participating member of the science team for the Department of Homeland Security New York City Urban Dispersion Program. Providing remote sensing and GIS expertise to support the modeling of airborne toxins.

Air Quality Analysis – 2000 - 2004

- Developed satellite image analysis techniques for air quality management programs involving atmospheric modeling and sub-grid surface parameterization.
- Developed visualization capabilities for 4D data sets of imagery, terrain, meteorology, air chemistry and observation data in real-time and over past time sequences.

NASA – 2000 & 2002

- Signed a five year Space Act Agreement with NASA Marshall Space Flight Center in March 2002 for commercialization of remote sensing technology.
- Signed Joint Sponsored Research Agreement with NASA in May 2000 to develop remote sensing technology for urban applications.

Forestry 1995 - 2000

- Chairman, Maine Wilderness Assessment, a non-profit organization established for the development of a remote sensing program to analyze forest resources in the State of Maine. Forestry remote sensing capabilities were utilized for species identification, insect and disease detection, stand density, wetlands, and GIS integration.
- Created a new market for satellite imagery in Canada. Established Kodiak Satellite Imagery to become the first company to sell high-resolution satellite imagery to the Canadian government and private forestry companies in British Columbia for forest mapping;
- Provided consulting services and value-added enhancements of satellite imagery to forestry companies, the Provincial Forest Service of British Columbia, and environmental conservation groups in Canada;

Flight Simulation and Data Visualization – 1997 - 2004

- Produced 3D flight simulation into Belgrade during the Kosovo crisis;
- Provided consulting services to a software company developing terrain sceneries for flight simulation software;
- Provided terrain and scenery data to a software company producing video games for entertainment;

Competitive Intelligence and Exploration 1997 - 2000

- Provided consulting services for targeting military outposts in central Africa;
- Provided consulting services for measuring electric power-plant activity from satellites;
- Provided consulting services to a company searching for a sunken aircraft carrier in the Pacific Ocean;
- Provided consulting services to a company searching for shipwrecks and sunken treasure off South America;

Navigation and Tracking Systems 1981 - 1986

- Pioneered computer navigation and tracking systems, resulting in consultations with the US Defense Mapping Agency, US Naval Intelligence, US Coast Guard, US Air Force, and multiple defense contractors.

PUBLICATIONS AND PRESENTATIONS

- *Estimating Urban Canopy Parameters using Synthetic Aperture Radar Data*; Indumathi Jeyachandran¹, Steven J. Burian¹, AMS Member, and Stephen W. Stetson; Journal of Applied Meteorology and Climatology
- *Surface Roughness and Z-0 Parameter Measured from Satellite-based Synthetic Aperture Radar*; Stephen W. Stetson, Report by Global Environmental Management, Inc., 2004 (http://www.rsat.com/sws/Z0_report.pdf)
- *Satellite Data Processing for Land Use and Cover Type Classification*; Stephen W. Stetson, Report by Global Environmental Management, Inc., June 2003, (http://www.rsat.com/sws/LULC_report.pdf)
- *High-Resolution Dataset of Urban Canopy Parameters for Houston, Texas*; Steven J. Burian, Stephen W. Stetson, WooSuk Han, Jason Ching, and Daewon Byun Fifth Symposium on the Urban Environment, American Meteorological Society, Vancouver, British Columbia, Canada, 23-28 August 2004 (http://www.rsat.com/sws/AMS_Vancouver_5th_Urb_Env.pdf)
- *Modeling Effects of Land Use/Land Cover Modifications on the Urban Heat Island Phenomena and Air Quality in Houston, Texas*; October 30, 2004, Investigators: Daewon Byun (PI), S.-T. Kim, Beata Czader, Bonnie Cheng, University of Houston; Stephen Stetson, GEM; David Nowak, National Forest Service, USDA; Robert Bornstein, (co-PI), San Jose State University; Mark Estes, Texas Commission on Environmental Quality (http://www.rsat.com/sws/Modeling_effects_of_LULC.pdf)
- *Utilization of Satellite-derived High Resolution Land Use/Land Cover Data for the Meteorological, Emissions, and Air Quality Modeling*; 2004, Institute for Multi-Dimensional Air Quality Studies, Daewon Byun, Soontae Kim, Fang-Yi Cheng, Stephen W. Stetson, David Nowak, Mark Estes, David Hitchcock (http://www.rsat.com/sws/utilization_of_LULC.pdf)
- *Lowering Urban Heat Could Save Billions*; Space Imaging periodical, "Imaging Notes," January/February 1999, Vol. 14, No.1; article about Systems for World Surveillance / Stephen Stetson
- *World Forests: Striking a Balance Between Conservation and Development - a Classroom Guide*; American Forests 1993, contributing author

Presentations to the following:

- U.S. Pentagon, U.S. Naval Intelligence, U.S. Naval Academy, U.S. Air Force, U.S. Coast Guard
- United Nations, Preliminary meetings to Habitat II Conference
- Embassies of NATO allies in Berne, Switzerland and Washington, DC
- Public and private conferences relating to satellite imagery and GIS
- Private meetings at ROV '84, Remote Operated Vehicle conference in San Diego, CA.

Guest Speaker for:

- Space Imaging at the annual distributor conference, February '98;
- Space Imaging at "GIS in the Rockies;" September '97;
- SPOT Image Corporation at SPOT seminar on imagery applications, Fall '95;
- National Association of Regulatory Utility Commissioners, Committee on Energy and Environment, '94;
- Edison Electric Institute, "Advances in GIS Technology for the Utility Industry," Fall '93;

Contributor of satellite or aerial imagery to the following publications:

- University of Athens publication, "Energy and Climate in the Urban Built Environment," March, 2001;
- Space Imaging's publication, "Imaging Notes," Jan. - Feb. '99;
- National Geographic Society's Seventh Edition Atlas of the World, Summer '99;
- National Geographic Society's Satellite Atlas of the World, November '98;
- National Geographic Society's magazine, February '98;
- National Geographic Society's Web site; '98
- Inside Science's TV news video on urban heat islands, June '98;
- the Boston Globe newspaper, August '97;
- Massachusetts Institute of Technology's journal, "Technology Review;" Feb. - Mar. '97;
- "Ca m'interesse," science magazine published in Paris, France;

EXPERIENCE WITH URBAN HEAT ISLAND (UHI) PROJECTS

- 1992 Research and development of the use of satellite imagery in Urban Heat Island mapping and mitigation studies.
- 1993 Gave presentation on the relationship between UHI mitigation and energy demand-side-management at a conference hosted by the Edison Electric Institute.
- 1994 Provided UHI maps of the region surrounding Atlanta, Georgia to the US Environmental Protection Agency. The project included a comparison of historical and current data.
- 1994 Gave presentation on UHI and energy efficiency to the National Association of Regulatory Utility Commissioners (NARUC).
- 1995 Produced UHI maps of 1) Tallahassee, Florida; 2) Sacramento, California; and 3) New York City for the local electric power companies, funded in part by a research grant from the American Public Power Association.
- 1995 Gave presentation on the benefits of UHI mitigation at the United Nations as part of the Habitat II conference.
- 1997 Provided UHI satellite imagery for publication in the Boston Globe newspaper.
- 1998 Provided UHI satellite imagery to the US Department of Energy for publication in the Massachusetts Institute of Technology's journal, "Technology Review;" Feb/Mar issue.
- 1999 Provided UHI maps for a television news video on UHI by "Inside Science."
- 1999 GEM's UHI program published in Space Imaging's trade journal, "Imaging Notes."
- 2000 Signed joint-sponsored research agreement with NASA and the Mississippi Space Commerce Initiative to develop commercial applications for UHI analysis.
- 2001 GEM's satellite imagery of urban heat island conditions published in "Energy and Climate in the Urban Built Environment," by the University of Athens, Greece.
- 2002 Signed Space Act Agreement with NASA to develop and commercialize technology for UHI studies and mitigation programs.
- 2003 Developed a new means to measure and verify the energy savings from reflective roofing materials through the use of remotely sensed imagery and energy use models.
- 2004 Directed the mapping of more than six million acres surrounding Houston, Texas for an urban heat island and air quality study for the State and Federal Governments.