

## Biography for Harry O. Ward, PE

**Mr. Harry O. Ward, PE**, is the President of Harken-Reidar, Inc., which was divested from Carlson Software to provide sales and services to civil engineers, surveyors, planners and construction organizations. Prior to that Ward was Vice Vice President of Carlson Software. The company he founded founded in 1991, OutSource Inc. merged with Carlson Software in 2006. He is nationally recognized as an engineer, engineer, consultant, teacher, author and lecturer and specializes in Computer Aided Design/Drafting. Over the past past 20 years, Mr. Ward has been a dedicated promoter of raising the level of computing knowledge in the AEC Industry worldwide. He has held the positions of Engineer, Project Manager, Director of IT, Vice President and President President for Private and Industrial firms and government organizations.



In January 2007, Ward founded Carlson College and developed a world-class staff of instructors, each with engineering and/or surveying licenses and at least 20 years of experience. Carlson College performs training internationally for Carlson and Autodesk customers. In October 2007, Ward developed the Civil Engineering Division into its own profit center and took on additional responsibilities as Vice President.

Ward is a licensed Professional Engineer and a licensed Virginia Contractor, certified in 3D Machine Control. His experience in CADD began with Intergraph/Microstation IGDS and AutoCAD version 2.14. He has been a member of the engineering faculty teaching required civil engineering undergraduate and graduate courses at **George Mason University** since 1997. Mr. Ward was appointed to the editorial advisory board of P.O.B. and Site Prep magazines in 2002 and as of January 2005 became a contributing editor with his own columns and online blogs called "The Technology Benchmark" and "Virtual Stringline" and recently has pioneered blogging for these magazines. Ward has published six university textbooks for Prentice-Hall, writes for CE News and CADence/CADalyst and is a frequent speaker on the lecture circuit delivering a dozen lectures per year to corporations, trade organizations and government agencies.

His extensive career in infrastructure has provided a background in transportation, airports and railways with a specialty in Automated Machine Guidance (AMG). He is a pioneer of 3D/GPS Machine Control and computer generated Renderings, Visualizations, and Graphic Animations for public hearings, presentations and forensic purposes. His forensic graphics and expert witness testimony have been used in civil, criminal and personal injury trials nationwide. Mr. Ward was one of the first people in the country to be certified in 3D/GPS Machine Control in 2002 and takes his knowledge of 3D civil engineering to new heights in the construction field using robotics for earthmoving. He teaches a unique course in 3D Data Prep.

Ward developed the concept of 3D Virtual Site Design™ and his professional development courses and seminars, offered nationally, incorporate the training method he developed called TIE Training™. Ward's Autodesk Training Center was awarded "Best Trainer on the East Coast by Autodesk in 2005.

He can be reached at [hward@harken-reidar.com](mailto:hward@harken-reidar.com) or [hward@gmu.edu](mailto:hward@gmu.edu);

## Employment

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**HARKEN-REIDAR, INC.**

(Feb. 2009-Current), President

**CARLSON SOFTWARE**

(Oct. 2006 – Feb, 2009), Vice President and Director of the Civil Engineering Division, Director of Carlson College, Director of Civil Sales for Va., Md., Africa and Australasia

**OUTSOURCE INC.**

(Feb 1991 - Current), Founder and Executive Vice President, Merged with Carlson Software, 2006

**GEORGE MASON UNIVERSITY**

(1997-Current), Adj. Professor of Engineering

**BNP PUBLISHING**

(Jan 2005) Contributing Editor, Staff Columnist & Blogger (2000-Currently) – POB & Site Prep Magazines

**BENGTSON, DEBELL, ELKIN & TITUS, LTD.** (Currently Burgess & Niple)

(May 1988 - Dec 1991), Information Technology (I.T.) Director

**BROWNING FERRIS INDUSTRIES (BFI)**

(Dec 1986 - Apr 1988), Project Manager, Corporate CADD Manager

**TCB INTERNATIONAL, INC. AND TURNER COLLIE & BRADEN**

(Mar 1979 - Dec 1986), Project Engineer, Automation Engineer

## Professional Registrations, Certifications and Appointments

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<b>REGISTERED</b>	Professional Engineer: (1987-Current)
<b>REGISTERED</b>	Consultant (SRC): (1992-1997) SoftDesk Inc.
<b>LICENSED</b>	Contractor: Virginia (1991-Current)
<b>LICENSED</b>	Contractor: Irrigation Design and Construction, Texas (1986 - 1998)
<b>CERTIFIED</b>	3D/GPS-Guided Machine Control – Topcon (2002- Current)
<b>AUTHORIZED</b>	Autodesk Premier Training Center (2001-Current)
<b>AUTHORIZED</b>	Bentley Institute Training Center (2009-Current)
<b>AUTHORIZED</b>	AutoDesk Consultant: (1997-2008)
<b>AUTHORIZED</b>	Sub-Contractor for the Va. Dept. of Transportation (1993-Current)
<b>APPOINTED</b>	Member of the Editorial Advisory Board for POB Magazine (2001-Current)
<b>APPOINTED</b>	Member of the Autodesk GIS Worldwide Customer Council (2002)
<b>APPOINTED</b>	Member of the Autodesk ISD Worldwide Customer Council (2003-2004)
<b>APPOINTED</b>	Chair - Autodesk User Group International – GIS (2002–2004)
<b>AFFILIATE</b>	Authorized SoftDesk Strategic Affiliate (S.A.) (1993-1996)
<b>APPOINTED</b>	Warren County Airport Commissioner (2004-2005)
<b>EDUCATION</b>	BSCE and graduate courses – University of Houston, 1984

## Current Professional Affiliations

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<b>MEMBER</b>	International Assoc. of Continuing Education & Training (IACET) (2008-Current)
<b>MEMBER</b>	American Society of Civil Engineers - ASCE (1984-Current)
<b>MEMBER</b>	Autodesk ISD/GIS International Customer Council (2002 – 2004)
<b>MEMBER</b>	North American AutoCAD User's Group (NAAUG, 1991-1997)
<b>MEMBER</b>	Intergraph Graphics Users Group (IGUG, 1984-1997)
<b>PRESIDENT</b>	SoftDesk User's Group (1993-1994)

**CHAIRMAN** ESI Technical Committee on Technical Data Transfer (1991-1993)  
**MEMBER** Engineers and Surveyors Institute (ESI) 1994 –1998

## **Speaking Engagements**

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- Professor** George Mason University (Sep 1997 - Current), CEIE 290 Engineering Computations, Graduate Level Courses: USE 690 Virtual Site Design, (Spring, 1994) Mr. Ward developed this course. USE585, Computer Assisted Engineering (Fall, 1994)
- Lecturer** Automated Machine Guidance, Penn State University, (Oct. 09)
- Lecturer** Current Engineering Technologies, CE News Virtual Conference, (Oct. 09)
- Lecturer** Survey Job Costing, Va. Assoc. of Surveyors. (Sept. 09)
- Lecturer** Ramifications of AMG on Design, MD Survey Society, (Sept. 09)
- Lecturer** CADD Shootout – 2010, CLSA, Los Angeles, (August 09)
- Lecturer** Machine Control and its Impact on Civil Engineering and Surveying, West Virginia 41<sup>st</sup> Annual Survey Convention, Morgantown, WV, (Feb., 2009)
- Lecturer** Viewing Your 3D Future - Man or Machine?, NYSAPLS, 50<sup>th</sup> Annual Conference, (Jan. 2009)
- Lecturer** Machine Control Panel Discussion, NYSAPLS, 50<sup>th</sup> Annual Conference, (Jan. 2009)
- Lecturer** Tools of the Trade For Design Challenges & Project Sustainability, Washington County Roads and Bridges Commission, (Oct. 2008)
- Lecturer** Automated Machine Control Man Vs. Machine, NCEES, Minneapolis, MN (Aug. 2008)
- Lecturer** Integrating Civil Engineering & Surveying, ExxonMobil, Houston, TX, (Sep. 2008)
- Lecturer** Man vs. Machine - Automated Machine Control Guidance, NYSAPLS, State-wide Speaking Tour, Rochester, Albany, Wappinger Falls, (May 2009)
- Lecturer** Integrating ESRI & Civil Engineering, ESRI 2008 Conference, San Diego, CA (Aug. 2008)
- Lecturer** Improvements to CADD Civil Engineering Software, Instituto Ingenieros Civiles, College de Ingenieros Agrimensores de Puerto Rico, (Apr. 2008)
- Lecturer** New Revenue for Surveyors - 3D Modeling and Data Prep, Virginia Association of Surveyors, (Mar. 2008)
- Lecturer** Moving into 3-D Design and Generating New Revenue: Land Development East, (Mar. 2008), Atlanta, GA.
- Lecturer** Moving into 3-D Design and Generating New Revenue: Land Development East, (Mar. 2008), Atlanta, GA.
- Lecturer** New Revenue for Design Firms - 3D Modeling and Data Prep: Arkansas Society of Civil Engineers Annual Conference, Feb. 2008
- Lecturer** Increase Productivity with Field To Finish: AECCADD, Knoxville, TN, (Feb. 2008)
- Lecturer** 3D Machine Control and the Impact to Design Firms: Land Development West: Las Vegas, Nov. 1006
- Lecturer** Autodesk Civil 3D Impact Tour: North Carolina, Florida, Texas, (2005-2006), Autodesk
- Lecturer** 3D/GPS Machine Control, Va. D.O.T. (Dec. 2005)
- Lecturer** How to Become a Construction Site Data Manager, Trimble Dimensions (Oct. 2005)
- Moderator** New Engineering Technologies, McGraw-Hill Outlook 2006 Exec. Conf. (Oct. 2005)

- Lecturer** The Role of Surveyors as Job Site Control Manager, ACSM-CLSA-NALS-WFPS (2005)
- Lecturer** The Role of the D.O.T. in 3D/GPS Machine Control (Nov. 2005) – V.D.O.T.
- Lecturer** A Lesson to Engineers - Work in 3D Please (May 2004) – NSVRC
- Lecturer** State of the Art Technology in Civil Engineering (May 2004) – FCPA
- Lecturer** Business Ramifications of Machine Control, California Land Surveyors Association and the Nevada Association of Land surveyors Annual Conference (Apr. 2004)
- Lecturer** The Anacostia Light Rail Demonstration Project (March 2004) - District of Columbia Association of Land Surveyors (DCALS)
- Lecturer** Machine Control from the Construction Viewpoint, Topcon Annual Convention, St. Augustine, Fl. (Nov. 2003)
- Lecturer** Machine Control from the Surveyor's Viewpoint, Topcon Annual Convention, St. Augustine, Fl. (Nov. 2003)
- Lecturer** Machine Control in Civil Engineering, AU2003, Las Vegas, (Dec. 2003)
- Lecturer** CADD Standards Enforcement, AU2003, Las Vegas, (Dec. 2003)
- Lecturer** Computer Renderings Lab & Workshop, AU2003, Las Vegas, (Dec. 2003)
- Lecturer** Computer Renderings Lab & Workshop, Autodesk University, (Dec. 2002)
- Lecturer** Civil Engineering Project Management, Autodesk University, (Dec. 2002)
- Lecturer** Technical Visualizations, *Autodesk University*, (Dec. 2001)
- Lecturer** Forensic Surveying, *Surveying & Mapping Society of Georgia*, (Jan. 2001)
- Lecturer** Forensic Graphics, *Maryland Surveyors Society State Convention*, (Feb. 1999)
- Lecturer** CADD for Civil Engineers (October - November 1998) *American Society of Civil Engineers (ASCE) National Tour* (Washington - Las Vegas)
- Lecturer** Stormwater Management (April, August 1998) *Engineers & Surveyors Institute*
- Lecturer** Project Management for Land Development, *Engineers & Surveyors Institute*
- Lecturer** CADD for Surveyors, Maryland Surveyors Society State Conference (1997)
- Lecturer** CADD for Surveyors, *American Congress on Surveying & Mapping (ACSM) National Conference* (11/97)
- Lecturer** Selection Process For Accounting Systems, Virginia CPE Forum, 7/93.
- Lecturer** Seminar On CADD Standards, *Engineers/Surveyors Institute*, 1992.
- Lecturer** A PRACTICAL COMPUTER WORKSTATION, *American Society of Civil Engineers (A.S.C.E.) Texas State Convention*, (
- Lecturer** Computer Aided Design, *West Iowa Technical Community College*, 1996
- Lecturer** Computer Aided Design, *Iowa Lakes Community College*, 1997
- Quoted** CE News, Feb, 2003 as an expert in GPS-Guided Machine Control
- Quoted** Grading & Excavation Magazine (Nov/Dec 2005) "Laser: Machine Control"
- Instructor** Lord Fairfax Community College (2002-Current), AutoCAD Workshop Classes
- Appointed** Panel Expert for ExCEL, Excellence in Civil Engineering Leadership, Balt. (Sept. 2003)
- Teacher** Warren County High School (Sep 1990 - May 1993), developed curriculum, wrote training manuals for COMPUTER APPLICATIONS I & II.

## Publications

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- Published** Textbook, Autodesk Civil 3D (2009): Procedures and Applications, Publisher: Prentice-Hall (2006), (2007), (2008), (2009), (2010)
- Published** Machine Control on West Virginia's Corridor H, SitePrep Magazine, (Nov-Dec 09)
- Published** Bright Spots on the Horizon, SitePrep Magazine, (Apr. 09)
- Published** Standardizing the Mystical Science of Machine Control, SitePrep Magazine, (Nov 09)
- Published** Textbook, Civil Drafting & Introduction to GIS, Pearson Custom Publishing
- Published** How to Keep Busy in a Recession, Site Prep Magazine (Jan. 2009)
- Published** POB Online Blog, Get Over It: The Economy is NOT Coming Back! and Happenings in the Biz and Infrastructure Stimulus, (1 to 2 blogs/month - Jan. 2009-Current)
- Published** How Your Association Dues Go To Work For You, P.O.B. Magazine (Dec. 2008)
- Published** Opportunities in Data Prep, Site Prep Magazine (Nov. 2008)
- Published** The Story Behind Licensure, P.O.B. Magazine (Sep. 2008)
- Published** A New Text for Machine Control Site Prep Magazine (Sep. 2008)
- Published** Higher Education for Surveyors, P.O.B. Magazine (Jun 2008)
- Published** Hindsight on the Site, Site Prep Magazine (Jul. 2008)
- Published** A Photogrammetry Primer, P.O.B. Magazine (Apr. 2008)
- Published** A 3D Modeling Primer, Site Prep Magazine (Mar. 2008)
- Published** The State Of The Art in 3D Machine Control, New York State Surveyors Magazine, (Mar. 2008)
- Published** Zooming from 3D to 4D and 5D, Site Prep Magazine (Mar. 2008)
- Published** The State of the Industry, Site Prep Magazine (Jan. 2008)
- Published** Tips to Evaluate Training Providers, Site Prep Magazine (Nov. 2007)
- Published** Common Themes on 3D GPS Modeling, Site Prep Magazine (Sep. 2007)
- Published** What's Holding Surveyors Back? P.O.B. Magazine (Dec. 2007)
- Published** Requiring Licensure For Digital Stakeout, Part 1, Site Prep Magazine (May, 2007)
- Published** Requiring Licensure For Digital Stakeout, Part 2, Site Prep Magazine (July, 2007)
- Published** Requiring Licensure For Digital Stakeout, P.O.B. Magazine (June, 2007)
- Published:** Maintenance of 3D/GPS Machine Control Equip., Site Prep Magazine, (Mar. 2007)
- Published:** Subscription GPS Networks for Machine Control', Site Prep Magazine, (Jan. 2007)
- Published:** Price Fixing vs. Cost Fixing, P.O.B. Magazine, (Mar. 2006)
- Published:** Water Witching (A Redux), P.O.B. Magazine, (Dec. 2006)
- Published** Textbook, Autodesk Civil 3D (2006): Procedures and Applications, Publisher: Prentice-Hall, New versions published 2007, 2008, 2009
- Published** 3D Themes, Site Prep Magazine, (Summer, 2005)
- Published** Autodesk Addresses Surveyor's Needs - Civil 3D 2007 P.O.B. Magazine, (Apr. 2006)
- Published** The Practice (and Polemics) Of Water Witching, P.O.B. Magazine, (Dec. 2005)
- Published** Civil 3D Return on Investment, Phase 2, Autodesk, (Fall 2005)
- Published** Civil 3D vs. Bentley InRoads, Autodesk, (Spring 2005)
- Published** Education And Training For Surveyors, P.O.B. Magazine, (Mar. 2005)
- Published** Imaginary Reference Stations, The Technology Benchmark, P.O.B. (Jan. 2005)

- Published** Autodesk® Education Curriculum for Civil 3D 2005, Co-author, Autodesk Press
- Published** High-Tech Solutions - A Fresh Roundup of Automated Equipment Offerings, Site Prep Magazine (Fall, 2004)
- Published** Civil 3D Return on Investment, Autodesk, (Fall 2004)
- Published** The CAD Enforcer, POB Magazine (Aug. 2004)
- Published** White Paper: Why Land Desktop is Better Than Eagle Point Autodesk (Jul 2004)
- Published** From Milkmen to Mainstream, POB Magazine (Dec. 2003)
- Published** Changing Protocol, CE News Magazine (Jul. 2007)
- Published** Effects of Machine Control in Civil Engineering, George Mason Univ. (Aug. 2003)
- Published** The LandXML Resources Continue to Expand, P.O.B. Magazine (Apr. 2003)
- Published** 2003 CAD/Surveying Software Survey, POB Magazine (Dec. 2003)
- Published** The Importance Of LandXML To The Civil Engineering, Construction And Surveying Industries, P.O.B. Magazine (Apr. 2003)
- Published** 2002 CAD/Surveying Software Survey, P.O.B. Magazine (Dec. 2002)
- Published** White Paper: A Competitive Review of Eagle Point vs. Land Desktop, Autodesk (Jun. 20)
- Published** White Paper: A Competitive Review of CAiCE vs. Land Desktop Autodesk (Jun. 2002)
- Published** White Paper: A Competitive Review of TerraModel vs. Land Desktop Autodesk (Jun. 2002)
- Published** White Paper: A Competitive Review of InRoads vs. Land Desktop Autodesk (Jun. 2002)
- Published** Digital CADD Standards, P.O.B. Magazine (Dec.2001)
- Published** Supplying the Proof, P.O.B. Magazine, (June 2000)
- Published** A Lesson to Engineers from Surveyors, P.O.B. Magazine (Oct. 00)
- Published** The Autodesk Land Development Desktop, (Apr 1999) CADence
- Published** Inroads to Civil Engineering: AutoCAD Add-ons from Softdesk & Eagle Point (Nov. 1997) CADence
- Published** Inroads SelectCAD (Apr. 1998) CADence
- Published** Visualization Software (Sep. 1998) CADence
- Published** Project Audit Trail (Jun. 1997) AEC Journal
- Published** Virtual Site Design (Nov/Dec 1996)
- Published** State Of The Art Computing, Building in Maryland Magazine (Sep. 1989)
- Published** Are Surveying Field Books Obsolete? ACSM Bulletin (Oct 1989)
- Published** GIS For Natural And Human Induced Disasters: Does It Work? U.S. Army Corps of Engineers - 7th Annual Symposium On Remote Sensing Proceedings (May 1990).
- Published** PC's FOR BUSINESS (Mar 1991), Training Manual for Warren County High School.
- Published** NON-AASHTO BASED ROADWAY DESIGN (Sep. 1992), TechTalk Technical Journal.
- Published** A PRACTICAL COMPUTER WORKSTATION, American Society of Civil Engineers (A.S.C.E.) Texas State Convention, (Oct. 1987)
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**Harry O. Ward, PE**  
Curriculum Vitae

Home Address: P.O. Box 648  
Front Royal, VA 22630

Employer: **HARKEN-REIDAR, INC.** - Front Royal, Virginia (Feb. 2009 - Present)

Title: PRESIDENT

### **DUTIES AND RESPONSIBILITIES:**

Mr. Ward rebranded his company as Harken-Reidar, Inc. in Feb. 2009 as a client advocate, software integrator, training and sales company. He immediately grew the company to become an Autodesk Authorized Training Center, a Bentley Channel Partner, a Haestad Methods Channel Partner, a Bentley Institute member, a Carlson Software Medallion Reseller and a Carlson College member. He was approved to be an IACET CEU provider based on a curriculum of education combined with training. All instructors are college degreed and licensed individuals who train over 2000 industry employees annually. Ward is responsible for the management and growth of this company and also routinely participates in training and sales activities.

### **MANAGEMENT ACCOMPLISHMENTS**

As Ward spun the company off from Carlson, he grew the company to \$750K in the first 9 months in the midst of the worst recession since the Great Depression. The revenues are split between services and sales with the sales arm bringing in \$300K. Ward developed relationships with Autodesk, Bentley Systems and Carlson Software and became certified by all of these leading manufacturers.

On the marketing side, he created a cold-call center to bring in leads and developed a sales staff of both inside and outside sales. He oversees all business and technical management for the company.

Ward extended the reach of HRI by opening offices in Pennsylvania and Texas. These offices, staffed by professional engineers, offer software sales, services and training to clients ranging from design firms, to government agencies to construction firms.

### **COMPUTER RELATED ACCOMPLISHMENTS**

Ward became an Autodesk Developer in 2009 for writing technical documents on their solutions. He brought in an accounting system for HRI along with a networked CRM solution. He rewrote all of the training manuals for the various curricula taught by the company and developed a mobile lab for regional training offered nationally.

Ward continues getting the word out about the new company by delivering 10 national lectures on technology, writing over a dozen articles and blogs on the industry.

Employer: **CARLSON SOFTWARE.**

Front Royal, Virginia (October 2006 - Feb. 2009)

Title: VICE PRESIDENT, Founder/Director of Carlson College, Founder/Director Civil Division

### **DUTIES AND RESPONSIBILITIES:**

Mr. Ward sold his company Outsource, Inc., to Carlson Software in Oct. 2006. In Jan. 2007 he **founded Carlson College** and performs international training for Carlson and Autodesk in the Civil, Survey and Construction fields. He was approved to be an IACET CEU provider based on a curriculum of education combined with training. All instructors are college degreed and licensed individuals who train over 2000 industry employees annually.

In September 2007, he **founded and oversees the Civil Engineering Division**, which is staffed by 10 sales executives worldwide. Immediate growth of 20% occurred during the first year. Ward also became the **Director of Key Accounts** for the corporation and sold engineering and surveying

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solutions to an ENR Top 30 engineering firm in an unprecedented sale. Implementation is ongoing and is overseen by Ward.

### **MANAGEMENT ACCOMPLISHMENTS**

Developed 12 training textbooks with accompanying datasets, hired all PE's and LS's with college degrees as instructors and his division trained over 2000 customers per year. He pioneered moving the company into virtual books and acquired approval to become an International Association of Continuing Education and Training (IACET) training provider. Ward developed a training reach-out program that includes custom, regional, fixed classroom and webinar based training forums and oversaw the CEU/PDH development for the successful 1<sup>st</sup> Annual Carlson Software User's Conference.

Founded and oversees the Civil Division and as Vice President he trained 10 sales executives in how to present the engineering software and taught basic design concepts. He also set a Tier 1 pricing structure for the company and is engaged in placing the company's product into the GSA multi-part schedule. His customer service, professionalism, and ability allowed him to acquire the largest engineering customer in company history, a firm of 300 employees and \$300M in annual revenue. He engineered the successful completion of 34 projects in 14 offices to prove the effectiveness of the software on actual projects. The success was enterprise-wide and includes all surveying, planning, and civil engineering departments nationwide. He directly oversees the implementation which is ongoing and will take a year. His teamwork with other sales executives grew the division 20% in the first year.

### **COMPUTER RELATED ACCOMPLISHMENTS**

Worked and consulted with a customer in California on a 4,000 acre development, to be constructed using 100% GPS-guided Machine Control. He developed and trained the 3D model for the entire project. Prior to construction, the work was used to acquire \$2M in additional contracts for the company in providing the stakeout for the project, and an additional \$2M was acquired to perform the construction review.

Employer: **OUTSOURCE INC.**  
Front Royal, Virginia (February 1991 - Present)  
Title: VICE PRESIDENT

### **DUTIES AND RESPONSIBILITIES:**

Mr. Ward founded this timely and **state-of-the-art** company in February 1991. It is dedicated to providing advanced CADD services. Following the company's founding, Mr. Ward was responsible for the direction of growth and general business plan and **managed all facets of the business**. As the company expanded, Mr. Ward assumed the title of Vice President and is in responsible charge of all technical activities for OutSource.

In addition to maintaining Registration as a Professional Engineer, he also holds a VA. Contractors License in Communications and is certified in Machine Control, is an Autodesk Authorized Software Developer and a Professor of Engineering at George Mason Univ. He also runs an Autodesk Premier Training Center and was one of the most senior Authorized AutoDesk GIS/AEC Consultants.

### **MANAGEMENT ACCOMPLISHMENTS**

**Founded OutSource Inc.** in February 1991. Has 24 years of experience in engineering automation, software development and application software training. In 1991, he was selected as a Beta Software Tester and Authorized Registered Consultant (SRC) for the SoftDesk Corporation. After Autodesk

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Curriculum Vitae

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acquired Softdesk he became an Autodesk GIS/Land consultant and immediately became one of their most experienced and most highly qualified consultants. He has been providing AEC software support to hundreds of organizations in the Mid-Atlantic region as well as nationally. He has extensive experience as an expert witness for civil, criminal and personal injury trials and has prepared forensic support graphics and animations for all of the above. He developed and manages the visualization division of OutSource as well as all technical activities within OutSource Inc. and the Autodesk Training Center operations.

### **COMPUTER RELATED ACCOMPLISHMENTS**

Mr. Ward has pioneered the use of CAD and other digital data for courtroom trials, depositions and negotiations. His generation of graphical support for forensic purposes is state-of-the-art. Mr. Ward has developed philosophies for 3D site development and using high-tech equipment can create renderings, animations and videotapes. He supervises and performs technical support on multiple contracts and specializes in re-engineering consulting firms to improve computer related workflow and dataflow. His background has included Civil Engineering usage of minicomputers, PC's and workstations. He has mastered the usage of software including all standard PC based applications, AutoCAD, SoftDesk, Eagle Point, Intergraph MicroStation, 3D Studio VIZ, Photoshop and Premiere. Services are currently being provided to clients nationwide. Revenues increased when Ward created a DataPrep department for building 3D models for construction and GPS guided machine control.

Mr. Ward has provided **Strategic Planning**, performs site surveys, consultation on Corporate Buy-outs and develops the automation investment strategies for many AEC firms. He is highly sought after for publications and speaking engagements nationally. He is a regular feature writer for such magazines as P.O.B., CADence and Microstation Manager magazines. Mr. Ward is a pioneer of Virtual Site Design (3D Civil Site Design), Digital CADD Standards and the use of Electronic Field Recorders and has been providing these services to many clients using Land Desktop software.

He was named chairman of the Engineers and Surveyors Institute (ESI) Committee for Technical Data Transfer in 1991 whose goal is to produce CADD drafting standards for use by the Plans Review Departments of Fairfax, Prince William and Loudoun Counties.

Employer: **BENGTSON, DEBELL, ELKIN AND TITUS, LTD. (BDET)**  
Centreville, Virginia (May 1988 - December 1991)  
Title: DIRECTOR OF INFORMATION TECHNOLOGY

### **DUTIES AND RESPONSIBILITIES:**

Reporting to the President, this newly created senior executive position was responsible for the reorganization of the Computer Services Department into the Information Systems Division and expansion of services from basic operations functions to a full service R&D, training and CADD applications support facility for the 7 offices of this Virginia Top Ten A/E/C firm.

Decentralized) support staff. He also developed many 3D models and renderings and animations for the firm's clients.

Responsibilities comprised **directing all voice and data computing activities** for the firm comprising multiple minicomputers, workstations, PC's, and CADD, for technical, accounting, phone systems and administration. In 1990 he was given a second title of **Corporate CADD Manager** and provided **hands-on support of the Intergraph, AutoCAD, DCA and GWN software systems** and supervised a hybrid (i.e., Centralized and

### **MANAGEMENT ACCOMPLISHMENTS:**

Increased computer use charged to projects 230% within 4 months of joining the firm. Increased computer based revenues 400% within the first 12 months. Computer revenues average 250% of the costs to run Information Systems. Created the client charge back system for the mini-computers, workstations and PC's. Reduced computer related write-offs by 95% within 6 months and maintained them as non-existent. He prepared all automation/acquisition plans and annual budgets; recommended, approved and selected vendors; purchased, installed and maintained all computer related items, managed all maintenance contracts and accomplished a 60% net reduction of maintenance costs with no production hardship.

### **COMPUTER RELATED ACCOMPLISHMENTS:**

**Successfully introduced the firm to Intergraph MicroStation and AutoCAD/DCA R10/11** workstation based CADD systems and design software. Supervised the customization of AutoCAD and optimized it to complement the firm's needs. Pioneered the Electronic Data Interchange (EDI) capabilities of the firm. Developed and **implemented a complete system Phase-in** to replace a Corporate-wide, centralized and obsolete VAX based integrated CADD system with distributed processing PC's and workstations. Researched, specified, acquired and implemented replacement systems. Developed methodology for translating existing technical files to the new formats. **Decentralized office automation** from a centralized, VAX based word processing application to PC. Developed the methodology to translate hundreds of documents without retyping. Initiated, planned and oversaw several major software development projects comprising: Data Archiving software, Disk Management software, VAX and PC Chargeback software, Data Collector software, Roadway Design software and the development of over 100 AutoLisp modules to augment engineering design (prior to the purchase of DCA). Developed a comprehensive set of automation policies, procedures and training programs for PC, CADD and VAX applications relating to engineering, office automation and accounting. Introduced the firm to systems integration, implemented distributed processing to the firm and acquired and installed high speed digital telecommunications.

Short list team member and pioneer of **leading edge multi-media marketing** presentations comprising computer generated 35 mm slide shows, 3-D Ray Tracing Models and Real Time demonstrations. Has been an **authorized BETA software tester for DCA Release 11 Engineering software**, and an authorized BETA software tester for Civilsoft's first version of CivilCADD Engineering Software during 1990. He also provided hands-on support of all software products in the firm and maintains *EXPERT SKILLS* in AutoCAD, Intergraph MicroStation, and SoftDesk Engineering software.

Employer: **BROWNING-FERRIS INDUSTRIES (BFI)**  
Houston, Texas (December 1986 - April 1988)  
Title: CORPORATE CADD MANAGER

### **DUTIES AND RESPONSIBILITIES:**

This newly created position was established to manage the startup of a Computer Aided Design/Drafting (CADD) Department supervised the complete installation and start-up of an Intergraph MicroVAX system networked to InterPRO workstations, Versatec and HP plotters and a Matrix QCR digital camera, managed the hiring, support and training of designers and operators as well as managing the design of all CADD projects and performing all software R&D.

Managed all aerial mapping and stereo digitizing contracts and was Project Manager for airspace asset calculations for BFI's 100+ landfills. The position expanded to provide support to BFI's Public Relations Department after he developed RAY-TRACED 3D CADD models and

renderings of sites using Intergraph's Project Architect & Modelview software. This technology contributed to the approval at Public Hearings of \$200 million worth of landfills.

**CADD ACCOMPLISHMENTS:**

Oversaw and implemented BFI's AM/FM for landfills. Oversaw the installation and testing of an Intergraph 250 system, networked to Unix based-InterPRO stations, Versatec electrostatic plotting and a Matrix QCR digital camera. **Formed a 24 hour a day Computer Aided Design/Drafting department** to perform design and drafting services for BFI waste facilities which **eliminated 90% of the manual drafting**.

Increased production of annual computer aided site analyses by **400%**, while eliminating 350 hours of annual overtime per employee. Responsible for the development of major engineering computer applications such as the design of landfills using 3-d technology and CADD site analyses linking Lotus spreadsheet macros with the Intergraph CADD system. Performed all research, development, coding, integration with existing software, testing, documentation, implementation, training, troubleshooting, vendor selection and related purchasing.

**ENGINEERING ACCOMPLISHMENTS AND PROJECT EXPERIENCE:**

Managed the Computer Aided Design and Drafting of hazardous waste and solid waste facilities and all related components. Supervised and supported CADD designers.

Designed construction and/or expansion plans for 7 sanitary landfills and 3 hazardous waste landfills using the CADD system. They were located in New Jersey, Colorado, California, Tennessee, Texas, and Hong Kong. Designed liners and leachate collection systems for the above, methane recovery systems, sedimentation ponds, storage facilities, pumping stations, force mains, site roadway design and site analyses.

**Minimum first year savings of \$1,500,000** were realized under his management as a result of performing methane recovery design projects in-house using CADD and CAE versus hiring consultants. Introduced the firm to Intergraph's sophisticated Project Architect Ray Tracing software, engineering workstations, digital photography and raster plotting.

Produced several multi-media marketing presentations using 3-D modeling, Ray Tracing and digital photography that were used in public hearings and landfill acquisitions totaling \$200 million. Extensive experience using Intergraph's ESP, DTM, Earthworks, User commands and Project Architect Ray Tracing software.

Employer: **TCB International, Inc.** (March 1979 - July 1982), Houston, Texas  
**TURNER COLLIE & BRADEN INC. (TC&B)** (July 1982 - December 1986)  
Title: **AUTOMATION ENGINEER**

**DUTIES AND RESPONSIBILITIES:**

While early duties included engineering design activities, the need arose in 1981 to apply CADD and other computer skills to the field of Civil Engineering. Trained in IGrds in 1981, mastered these skills and moved into a position of supporting other engineers in using computers to accomplish the design of their projects. These duties included identifying needs, developing software, training engineers, writing documentation and performing design on projects hand-in-hand with users.

**APPLICATIONS SUPPORT ACCOMPLISHMENTS:**

**Pioneered the use of the Intergraph CADD system** for site development engineering in January 1981. Assisted in the system's evolution to become a "cradle to coffin", major Highway and Transportation Design environment by 1984. He managed the CADD design of the **\$1 Billion, HARDY TOLL ROAD** project, using **AASHTO's Roadway Design System (RDS)** integrated with Intergraph CADD. In 1984 he received a transfer to the Information Systems

Division and **provided software support to 80 engineers** and designers. The support comprised research and development on VAX 11/780 and 785 based Intergraph CADD systems, AutoCAD, IBM, DEC and Apple Macintosh PC's, performed training, design trouble shooting, software development, maintenance and enhancement, conversions, upgrades, validation and opportunity cost studies. He also implemented **AutoCAD on 286 based PC's**.

### **SOFTWARE DEVELOPMENT:**

- Worked on the Data Acquisition & Data Entry for the City of Houston's GIS project.
- Wrote an automated Bid system for the Navy Homeport Project,
- Wrote an automated lift station design system integrated with Intergraph,
- Wrote an automated scheduling system for South East Treatment Plant,
- Wrote a Digital Surface Modeling (i.e., DTM) system and integrated it with Intergraph,
- Wrote a program to calculate subsidence based on cross sections and topos,
- Wrote a program for checking highway design based on Texas Highway Standards,
- Wrote a database program to perform Human Resources EEOC compilations
- Extensive experience in using and providing support for software such as IGrds, COGO, HEC1, HEC2, THYSYS, KYPIPE, DTM, RDS, Earthworks, AT&T StarLAN, WordPerfect, PERT, PROMIS, Lotus, and Dbase.

### **ENGINEERING ACCOMPLISHMENTS AND PROJECT EXPERIENCE:**

Extensive **International and Domestic** design experience in providing services for residential, commercial, governmental and industrial projects, comprising:

- Waste Water collection systems for Jubail Saudi Arabia, a city of 300,000,
- Water distribution network analysis for Jubail, Saudi Arabia using KYPIPE,
- Design of the wastewater treatment plant expansions for the Gulf Coast Waste Disposal Authority and Saudi Consolidated Electric Company,
- Design of site development projects for Abqaiq and Udaliyah, Saudi Arabia,
- Preliminary planning and final design of the Hardy Toll Road using AASHTO's RDS,
- Design of storm water lift station for Houston Intercontinental Airport,
- Geometric and surveying computations for dozens of projects,
- Drainage improvements on residential, commercial, and industrial sites,
- U.S. and International land development and subdivision design,
- Irrigation, drainage recovery and recycling and under-drainage design
- Analyzed 100 year flood water levels of the Addicks and Barkers Reservoirs
- Scheduler for the South East Water Purification Plant (SEWPP)
- Supervised the hydrologic modeling of Cypress Creek on Intergraph
- Property investigations, Value Engineering and opportunity cost studies