

DEBRA S. SCHWARTZ
280 Yoakum Pkwy #1206
Alexandria, VA 22304
(703) 461-3330 (571) 296-9146 cell
dsschwartz57@comcast.net

EXPERTISE:

Over thirty years experience in scientific/engineering computing, analytical process development, engineering analysis, photogrammetry for advanced geometric metrology, creation of software design/process logic to perform related applications of the former, and engineering legacy and research software improvements. Expertise includes analytical photogrammetric (vision) and theodolite metrology, least squares adjustment (parameter estimation) and other numerical techniques, uncertainty/error analysis, geometric transformations, engineering mathematics/application logic and software, and associated technical writing.

PROFESSIONAL EXPERIENCE:

ERDAS, Alexandria, VA

December 2007 – present

Senior Photogrammetric Engineer: Resident photogrammetrist for Americas and National Programs office. Projects include adapting photogrammetric techniques for UAVs and customization of ERDAS application software:

- ◆ UAV – photogrammetric support for projects generating on-board direct geo-referenced and orthorectified imagery in near real-time including procedural logic and algorithm development for data reduction, analysis, calibration procedures and report writing; Designed and wrote software to perform creation of geo-referenced and orthorectified NITF imagery on-board aircraft.
- ◆ ERDAS customization – created customized algorithms and software for implementation in ERDAS software products for DoD customers
- ◆ Business Development - proposal editing and reviewing.

Consultant

February 2007 – present

Engineering analysis and photogrammetric consultant. Private sector support for traditional photogrammetric airborne mapping, close-range photogrammetric analysis, optical calibration, and geometric transformations.

IAVO Research and Scientific, Durham, North Carolina

October 2002 – February 2007

Senior Engineer: Investigator on several R&D photogrammetric-related contracts (mostly SBIRs) with emphasis on applications such as Naval weapons and targeting and three-dimensional terrain data reduction. Tasks include review of existing practices, development of new and/or improved algorithms, and program logic, design, and coding of such algorithms. Photogrammetric consultant to Southeast Division of Applied Research Associates. Support private sector traditional photogrammetric airborne mapping clients.

Science Applications International Corporation, Melbourne, Florida

June 1996 – September 2002

Senior Scientist: Assistant program manager/team member for several contracts involving use of Synthetic Aperture Radar (SAR) and Interferometric SAR (IFSAR) for three-dimensional terrain data reduction and target location. Support city, state, and private photogrammetric clients. Consult / Assist on NSWC, USGS, DARPA, and NIMA photogrammetric-related contracts, and IR&D activities in other areas.

- ◆ SAR/IFSAR – transformation and improvement of experimental SAR / IFSAR algorithms and software to prototype level; involved in adapting photogrammetric techniques to SAR/SAR 3D measurement computations for both satellite and airborne sensors;
- ◆ Photogrammetric Assistance - consultant to personnel at Naval Surface Weapons Center for applying techniques to automatic target recognition/location; assistant on UAV sensor math model and data parser design and implementation.
- ◆ Commercial Rectification - developed software to semi-automate data preparation for rectification. Developed streamlined process for single photo rectification in a production mode. Developed algorithm to enable single photo

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resection with linear control. Applied developed software to client acquired imagery for use in engineering applications.

Lockheed Martin Tactical Aircraft Systems, Fort Worth, Texas (formerly General Dynamics Fort Worth Division)

January 1981 - June 1996

Engineering Group Specialist: Responsible for development and documentation of analytical processes, procedures, simulations, and error analyses. Consultant in analytics, metrology, and engineering data analysis for section. Company resident expert in photogrammetry and its applications. Highlights include:

- ◆ design, development, and documentation of analytics/algorithms and corresponding software for
 - determination of relative position of one moving body to another from on-board (static and moving) cameras without stereo imagery – used for store separation tests conducted via wind tunnel and flight testing;
 - Vision Metrology System (a patented, automated non-contact 3-D measurement system) including metrology (photogrammetric / surveying combination), image processing, and applications logic; also optical calibration procedure for a variable focus/zoom optical system, and precision and accuracy tests;
 - automated stage calibration of independent servo-controlled linear axes and stage-to-model axis orientation using both laser triangulation and video area array sensor data for Automated Model Finishing System;
 - industrial applications of computer connected digital theodolites;
 - on-line data acquisition and on- and off-line data reduction of Nozzle Thrust Stand;
 - various stand-alone data reduction programs for non-photogrammetric educated users; created simulations to model photogrammetric and theodolite applications;
 - expanded implementation of selected aeroanalysis algorithms to include rigorous uncertainty/error analysis and computer simulations to create new and more effective programs for dynamic engineering tests;
- ◆ application of vision metrology to various applications in both engineering and production: measurement of F-16 jigs and tools, wind tunnel model parts, structural movement simulation, relative motion of missile fuel bladder, helmet deformation under G loads, ...;
- ◆ proposal technical lead and investigator for several Independent Research and Development (IR&D) Programs.

AEA Technology Engineering Services, Inc. Pittsburgh, Pennsylvania

September 1994 - April 1995

Consultant: Assisted Precision Services (Groton, Connecticut), a start-up subsidiary, in photogrammetric analytics, metrology, and engineering data analysis, providing application expertise, mathematics, and software as needed.

H. Dell Foster Associates San Antonio, Texas

February 1987

Consultant: Prepared material for and conducted technical training to transfer photogrammetric technology to foreign company buying manufacturing rights to H. Dell Foster equipment.

Purdue University School of Civil Engineering, West Lafayette, Indiana

September 1979 - December 1980

Teaching Assistant, Division of Surveying and Mapping

United States Geological Society, National Mapping Division, Eastern Mapping Center, Reston, Virginia

May 1980 - June 1980

Cartographer, Data Management Branch, Digital Data Section: Intern learning USGS digital mapping techniques.

Defense Mapping Agency Aerospace Center, Kansas City, Missouri

June 1979 - August 1979

Cartographer: Summer Intern learning various mapping techniques.

COMPUTER KNOWLEDGE:

Operating Systems:

UNIX, Windows, DOS, NeXTstep

Hardware:

Sun, Tektronix, Masscomp, SGI, PCs

Languages (varying levels):

C/C++, Fortran 77 and 90, IDL, Objective C (OOL), Basic

Miscellaneous:

MS Word, Excel, and Power Point

ERDAS Imagine and LPS

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EDUCATION:

BSCE, Civil Engineering, Union College (NY), 1979, cum laude
MSCE, Photogrammetry, Purdue University, 1980
Post Masters Work in Photogrammetry, Purdue University, Fall 1980

MISCELLANEOUS:

Security Clearances: TS /SCI
Professional Licenses: Registered Professional Engineer (Texas #56459 - inactive)
Professional Associations and Memberships: American Society of Civil Engineers
American Society of Photogrammetry and Remote Sensing
National Society of Professional Engineers
Tau Beta Pi National Engineering Honor Society
Remote Sensing and Photogrammetry Society (Great Britain)
Awards: 2 General Dynamics Technical Performance Awards
References: names provided upon request

Publications and Presentations:

Near Real-Time From Above (co-authored with S. Piepenburg), Geo-Spatial Intelligence Forum, Vol. 7 Issue 4, June 2009.

Complex Synthetic Aperture Radar Data Compression (co-authored with F.R. Cirillo and P.L. Poehler), Proceedings of SPIE Aerosense 2002 Conference, Vol. 4727, Orlando, Florida, pp 186-195

P-3 Motion Compensation Techniques (co-authored with A.W. Mansfield and H. Rais), Proceedings of SPIE Aerosense 2000 Conference, Vol. 4050, Orlando, Florida, pp 219-231

Where In The World Is ...? - internal Lockheed Martin paper describing Image Analysis System, May 1995

Vision Measurement at General Dynamics Fort Worth Division - invited viewgraph presentation for Machine Vision Association of the Society of Manufacturing Engineers' seminar entitled *Lighting and Optics Technology for Machine Vision Applications*, Dallas, Texas, October 1990

Vision Metrology System: An Automated Noncontact Three-Dimensional Measurement System, Technical Papers of Electronic Imaging East 89 October 1989 - presented at Electronic Imaging East 89 conference, Boston, Massachusetts

VMS (Vision Metrology System), AST News (internal department newsletter), Vol. 2 No. 2, July 1989

Vision Metrology System: An Automated Noncontact Three-Dimensional Measurement System, Technical Papers of the 1989 ASPRS/ACSM Annual Convention, Volume 1, April 1989 - presented at 1989 American Society of Photogrammetry and Remote Sensing / American Congress on Surveying and Mapping Annual Convention, Baltimore, Maryland

Editor, Proceedings for State-of-the-Art Close Range Photogrammetry and Surveying Symposium and Workshop, 1984 American Society of Photogrammetry and Remote Sensing / American Congress on Surveying and Mapping Fall Convention

Course Notes for Vision Metrology System Training: *Industrial Photogrammetry and Surveying*, General Dynamics Fort Worth Division In-House Training Course, 1984

Close-Range Industrial Photogrammetry - viewgraph presentation for 1982 Manufacturing Technology Advisory Group (MTAG) Meeting, Phoenix, Arizona

Close-Range Photogrammetry for Aircraft Quality Control, Technical Papers of the American Society of Photogrammetry, 1982 - presented at 1982 ACSM-ASP Annual Meeting, Denver, Colorado)

The Close-Range Column: Computer Modeling for Predicting Tolerances in Industrial Applications of Photogrammetry, Photogrammetric Engineering and Remote Sensing, Vol. XLVII, No. 9, Sept. 1981

Proofing, Reviewing, and/or Problem Solving -

DEBRA S. SCHWARTZ

McGlone, J. C.(ed), Manual of Photogrammetry, 5th Edition, American Society of Photogrammetry and Remote Sensing, 2004

Mikhail, E.M., and G. Gracie, Analysis and Adjustment of Survey Measurements, Van Nostrand Reinhold, 1981

Davis, Foote, Anderson, Mikhail, Surveying: Theory and Practice, 6th Edition, McGraw-Hill, 1981

Primary Illustrator -

Hibbeler, Russell C., Engineering Mechanics: Dynamics Solution Manual, 2nd Edition, Macmillan Press, 1978