T. Troy Stark

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Summary of Qualifications

Highly motivated professional physicist with exceptional problem solving and communication skills. B.S. in physics and M.S. in atomic physics. Experienced in leadership performance; system engineering functions; optical and electro-optical system and component design, test and analysis; mathematical modeling and analysis; teaching, demonstration, computer programming, and writing & presentation. Active DOD secret clearance.

Professional Work History

Engineer IV Design, Electro-Optics, Mission Research & Technical Services, ATK; Santa Barbara, CA, May 2007 – Present.

- Data analysis, threat determination algorithms.
- Physics analysis- optical signal propagation.
- Coherent multi-pulse LIDAR system development including test and measurement of complex laser system parameters, single frequency locking of independent lasers, optimization of power & beam profile, optimization of second harmonic generation (SHG) and critical timing and alignment of detection systems.

Senior Physics Engineer II, Opto-mech Department, Santa Barbara Remote Sensing, Raytheon Space and Airborne Systems; Santa Barbara, CA, June 2005 – May 2007.

- Responsible engineering authority (REA) on a space based imaging subsystem redesign and rebuild involving optical, thermal and structural redesign and organizing the efforts and time constraints among several specialty engineers.
- Lead teams preparing presentations to customers on a large technical program, including resolving complex issues regarding verification of compliance with requirements, the requirements matrix and anomalies. (VIIRS NPPOES).
- Chaired meetings designed to communicate with customers, assess program status regarding individual subsystems and plan the path forward.
- Prepared and delivered formal presentations of space based imaging subsystem components build histories requesting customer consent to integrate these components in their next higher assemblies.
- Organized and participated in engineering product reviews including specification tailoring, system requirements flowdown to subsystems and overall system implications of subsystem tests and analysis.
- Assisted in performing design and data analysis of a space based imaging subsystems comparing design expectations of FOV, PSF, LSF, BBR and other parameters to laboratory measurements.
- Part of a team developing and performing laboratory testing, construction and alignment of a space based hyperspectral imaging subsystem. Vacuum system, cryocooler, data acquisition, optical alignment and imaging.

Physicist / Optical Engineer, R&D, Spiricon Inc.; Logan, UT, Sept 1998 – June 2005.

- Performed research and development (R&D) functions in support of new product and business development: Sonic imaging, high power beam profiling, UV beam profiling, industrial laser beam analysis, power & energy measurement, fiber optic mode measurement, thermal imaging, remote temperature sensing, beam conditioning.

- Designed an IR imaging system (5-20μm) and developed thermal imaging calibration procedures for remote temperature measurement.
- Developed operational algorithms for thermal imaging & remote temperature sensing, **image processing for laser beam analysis** and wavefront sensing as well as predictive laser power monitoring and measurement.
- Designed and developed high power laser beam sampling systems for laser beam analysis applications.
- Designed lenses and systems for specific imaging and non-imaging applications.
- Designed fiber optic mode analyzer hardware and image processing algorithms.
- Tested ccd cameras for spectral responsivity and linearity.
- Analyzed power meter systems and other detectors.
- Developed test procedures for optical components.
- Developed test set and calibration process for a ccd based Hartmann Wavefront Sensor.
- Demonstrated optical instruments for potential clients and sales staff.
- Developed Mathcad sheets and small C++ applications to validate laser beam analysis software and generate test data.
- Worked with vendors to develop material and coating requirements for components that would both perform well in our products and be reliably produced by the vendor.
- Wrote user manuals and tutorials for a complex industrial laser beam analysis system, a thermal imaging system, a wave-front analysis system and a various optical accessories.
- Wrote technical specifications for test & production systems as well as products.
- Hands on work with high-power CO2 lasers and YAG laser experiments, UV laser systems, fiber optic lasers and fiber optic mode analysis. Optical systems, vacuum systems, high voltage and various gas handling equipment.

Graduate Teaching Assistant, Utah State University; Logan, Utah, 2 yrs.

- Experienced in hands-on laser laboratory work and research projects, including femto-second Ti-Sapphire laser operation and data acquisition. Optical systems, vacuum systems, high voltage and various gas handling equipment.
- Worked as a teaching assistant at BYU and USU.
- Taught laboratory physics courses and physics recitation sections.
- Completed USU's seminar for college teaching.
- Won awards for writing in reporting on research progress.

Scientific Programmer, Space Environment Corporation; Logan, Utah, 1.5yrs.

- Created model validation software for data analysis and graphical display using FORTRAN on a UNIX platform. Applications performed statistical analysis of satellite data compared to numerical models of ionosphere dynamics.

Research Scientist, X-ray laser project. MOXTEK corporate research facility; Orem, Utah; 3yrs.

- Developed processes for applying electrodes to HgCdTe crystals leading to the manufacture of X-ray detectors.
- Built & operated experimental setup for spectroscopic determination of temperature & ionization states over time in a capillary discharge through Argon. High voltage, extreme vacuum and multiple gas handling systems.
- Wrote and presented research results and technology development papers at professional conferences.

Training

ZEMAX Optical Design I
Advanced topics in **CODE V**
Systems Engineering Course (Raytheon)
Optical Design Course
Optical Systems Course.
Raytheon Six Sigma Course.

Education

Physics Dept., Utah State University; Logan, Utah.

- Optical Engineering Course,
- Completed course work & passed Ph.D. comprehensive exam.
- Courses in Plasma Physics and Computer Modeling of Space Plasmas using Finite Element Methods.
- Completed the Seminar for College Teaching.

M.S., *Atomic Physics*. Brigham Young University; Provo, Utah.

- NSF-ACERC Scholarship.
- Research Report Awards for Writing; BYU Physics Dept.

B.S., Major: *Physics*; Minor: *Mathematics*. Weber State University; Ogden, Utah.

- National Deans List.
- Outstanding Senior Award
- Paul Huish Scholarship
- Richie Scholarship

Technical Skills

MathWorks, **MATLAB**
Microsoft **Word**, **Excel** and **PowerPoint**; (highly proficient)
ZEMAX Development Corporation, **ZEMAX** Optical Design Program;
Mathsoft, **Mathcad**; (highly proficient)
IMSI, Visual CAD;
Microsoft, **Visual C++**; **Fortran**;
Wolfram Research, Mathematica;
Optical Research Associates, **CODE V** (some experience including an advanced applications course)
PTC, Pro/Engineer (low level of experience)
Web page design

Professional Affiliations

Member, Optical Society of America (OSA)