



Resume of
Paul T. Richards

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Strengths: [1] Systems engineering and technology development for complex scientific systems, [2] Technical leadership of systems and software development projects.

Keywords: Systems engineering, sensors, signal processing, CONOPS, system architecture, software architecture, algorithms, visualization, Perl, C, analysis, tracking, radar, seismics, MASINT, statistics, estimation, optimization, e-commerce, rare coins.

Current Experience, 2004 to date: Quantum Technology Science, Inc.

2006 to present: Principal engineer at QTSI headquarters responsible for corporate-wide systems engineering, concept definition, and business development.

2004 to 2006: Principal engineer responsible for execution of seismic and acoustic MASINT development project for the Underground Facility Analysis Center (UFAC), part of the Defense Intelligence Agency (DIA). Mr. Richards lead a team of geophysical scientists, software engineers, and hardware engineers to integrate a multi-node network of seismic sensors and signal processing algorithms for detection, location and classification of near-surface sources of seismic and acoustic energy. Mr. Richards was responsible for customer interface, requirements generation, system design, system integration, system test, and overall technical leadership. The state-of-the-art MASINT network performs well, detecting small sources at long range and accurately locating them.

2004: Technical book boss for QTSI's Science and Engineering Division proposal to the USAF Aeronautical Systems Center (ASC), Wright Patterson AFB, Ohio. This winning proposal was for operation and development of the United States National Data Center (US NDC) at Patrick AFB, Florida. The US NDC is a large, real time data acquisition and analysis center for worldwide monitoring of seismic, acoustic and radionuclide data. Mr. Richards developed and supervised a winning approach for QTSI's assumption of US NDC Total Systems Integration Responsibility (TSIR), concentrating on system tradespace definition, systems engineering process refinement, program work structure definition, i.e., the SOW, program management methodology and transition from the current US NDC contractor. Mr. Richards lead experts from QTSI (as prime contractor) and SAIC (as subcontractor) for development of a comprehensive software spiral build plan and application of advanced geophysical technology to meet current and emerging mission requirements.

During the 2004 time frame, Mr. Richards also designed and executed technical experiments for an internal QTSI concept called Seismic Arrays for Local Situational Awareness (SALSA). He wrote, submitted and won proposals (~ \$1M each) for developing a Psychological Operations

(Psyop) system, a Single Integrated Ground Picture (SIGP) system and for processing MASINT signals from Underground Facilities (UFs) and Improvised Explosive Devices (IEDs).

Prior Experience, 1997 to 2004: Northrop Grumman Corporation

1997 to 2004: Director of Concept Development and Operational Analysis function within Northrop Grumman Airborne Ground Surveillance and Battle Management Systems business area. Mr. Richards developed operational concepts, architectures, analysis, modeling and simulation of complex, multi-platform military systems of systems focusing on the future constellations of Intelligence, Surveillance and Reconnaissance (ISR) systems, especially systems for constructing dynamic pictures of the ground and maritime battlespace. He contributed as a senior advisor to help Northrop Grumman's team capture the Battle Management Command and Control (BMC2) subsystem of the E-10A multimission aircraft, worth \$600M dollars. He defined user-oriented concepts of employment for large airborne Radar Technology Improvement Program (RTIP) X-band radar systems for surveillance, situational awareness and targeting of ground objects. Mr. Richards wrote the initial draft CONOPS, developed user-oriented system performance models and operator-in-the-loop simulations for RTIP radars aboard widebody air platforms. During this time period, Mr. Richards also developed top-level concepts for applications in Unattended Ground Sensors, Ballistic Missile Technical Collection, Boost Phase Kinetic Intercept, Cruise Missile Defense, GMTI-Based Operating Pictures and Multi-Mission Command and Control.

Prior Experience, 1992 to 1997: Northrop Grumman Corporation

1992-1997: Technical Advisor and developer of advanced systems and software for the Joint STARS airborne radar system and its derivatives. Mr. Richards developed requirements, design, coding, integration and test of Joint STARS systems and algorithms. He was responsible for leading groups of developers and presenting results to customers. One example product developed during this time frame is a hardware and software system built for Air Force Research Laboratory (AFRL), Rome, NY. This system used a high performance Paragon supercomputer to fuse simulated surveillance data from the Joint STARS radar with complementary data from offboard sources such as Rivet Joint, AWACS and unmanned aerial vehicles. A second example is Mr. Richards design, coding and integration of an integrated a high-fidelity simulation of the Joint STARS radar in its Ground Moving Target Indicator (GMTI) mode. This simulation includes target generation, target detection and beam pointing algorithms.

Additional Experience, 1993 to date: Stat-Matics, Inc.

2005-date: President of Stat-Matics, Inc, a Florida corporation focused on military systems and web sales and services.

1993-2005: Sole proprietor of Stat-Matics Rare Coin Company. Mr. Richards buys and sells rare collectible coins on the Internet. He authored and is webmaster of Perl/CGI scripts to implement an innovative e-commerce site. Mr. Richards also has published four original manuscripts in *COINS*, *COINage* and *Coin World*, national magazines for coin collectors.

Prior Experience, 1969 to 1992: Grumman Aerospace Corporation

1988-1992: Engineering Analyst for Joint STARS software development. Mr. Richards was responsible for an average of 10 software engineers during this period, working on various configuration items for delivery as embedded software with military documentation. One example product is the RDO configuration item that operates the Joint STARS radar. This software includes transmit, receive, signal processing and data processing functions in 300K lines of Fortran code.

1985-1988: Engineering Analyst for a software project which processes telemetry data from the F-14D Tomcat fighter aircraft. Data is acquired from airborne and ground sources simultaneously, linked to a central computing facility and processed to graphical displays in real time. Primarily responsible the time and space position information (TSPI) software. This software formed a Best Estimate Trajectory (BET) for fixed-wing aircraft from radar, inertial and DME sources.

1981-1985: Software engineer working on a software system which identifies structural resonances in aircraft wings from flight data. Kalman filters, global optimization, Fourier transforms, least squares regression, eigenvalue extraction. Applied to F-14A, A-6E and X-29A (forward swept wing) aircraft. Also developed a weapon tracking algorithm for the Pave Mover project, predecessor of Joint STARS.

1979-1981: Software engineer working on a compact aircraft navigation system called MAPSET. Multiple DME range measurements estimate aircraft trajectory to high accuracy. Central to both hardware and software design. Coding includes Fortran and assembly language.

1969-1979: First 10 years experience as a Flight Test engineer with topics covering flight data analysis, statistical modeling, trajectory estimation, non-parametric statistics and pre-GPS pseudorange experiments.

1970-1976: New York Air National Guard. Communications specialist. Staff sergeant. Honorable discharge.

Education: BSEE, University of Maine, Orono, ME. June 1969. With High Distinction. Tau Beta Pi, Eta Kappa Nu, Phi Kappa Phi. GPA 3.4/4.0

Computer: C, Perl, HTML; Unix, W32; CGI, Workstations

PC: Word, Excel, Power Point, Photoshop, Acrobat

Clearance: Top Secret