ALAN THOMPSON

3019 Pueblo St. • Carlsbad, California 92009
619-227-1132 • thompson2526@gmail.com

SENIOR-LEVEL ENGINEERING:
Software Engineering, Defense R&D

Software development expert with the proven ability to combine engineering solutions with targeted software implementations to meet and exceed project goals. Innovator with a long track record of leveraging cutting-edge technologies and tools to automate processes and dramatically increase efficiency and productivity. Highly skilled research & development specialist with more than 20 years of demonstrated expertise designing process improvements, algorithms, and technical solutions that boost performance and accuracy in the defense and aerospace industries.

Software Engineering • Research & Development • Software Testing/Implementation • Signal/Image Processing
Detection • Classification • Tracking • Statistics • Estimation • Prediction Automation • Algorithm Design
• Documentation • Team Leadership • Early Reviewer for Book “Programming Groovy”

PROFESSIONAL EXPERIENCE

SAIC, San Diego, California • 5 Years
Defense contractor with 40K employees.

Senior Scientist
Perform classified (Top Secret/SCI) defense research in signal/image processing, detection, classification, tracking, statistics, and estimation (research is peer-reviewed at bi-monthly status meetings with the government customer and other researchers). Design and implement algorithms in Fortran, C/C++, and Java/Groovy on Linux and Windows computers. Conduct data analysis using Matlab and IDL. Carry out extensive software engineering, computer infrastructure upgrades, and software process improvement.

- Wrote numerical analysis utility using Groovy for complex exponential decay model dependent on multiple initial parameters. Used parameterized closures to loop over all possible inital values, creating output tables for varing IC's.
- Used Groovy to automate a cumbersome, manual data processing utility based on legacy BASH scripts. Using templates, enabled automated creation, formatting and submission of large data processing jobs for a clustered computing system. Automated staging of multi-terabyte input data and collection/distribution of processed results files.
- Refactored C++ scientific code built on the obsolete Borland IDE and ported to the GCC compiler. Replaced proprietary function calls with STL equivalents, including extensive regression testing and benchmarking. Eliminated approximately 100K of 150K lines of unneeded legacy and GUI code. Identified a single-line bottleneck consuming 10 of 12 hours in standard data runs, and replaced the inefficient linear search with a custom-written binary search requiring only 2 seconds total execution time (approx 20K:1 speedup of search). Increased data processing throughput from one dataset per night to over 20 datasets per night.
- Boosted project team productivity by 25% by implementing a project-wide system of software configuration management using Subversion and code reviews. Wrote project SCM and software peer-review procedures, including coding standards, style guides, unit tests and regression tests.
- Identified inefficient disk I/O in a legacy data access library for a multi-terabyte scientific processing algorithm wasting 2 of 3 processor minutes on large compute clusters. Proposed & tested a replacement algorithm using the robust, state-of-the-art HDF5 library for a 3:1 speedup in the standard data case. Estimate savings of at least $3M/yr from improved labor efficiency alone when fully implemented.
- Evaluated detection, estimation, and tracking algorithms and quantified their effect on system performance using recorded experimental data.

ALPHATECH, San Diego, California • 1 Year
Defense contractor with 200 employees.

Senior Engineer
Founded new San Diego branch of Alphatech (based in Boston, Massachusetts) with 2 other individuals. Coordinated software integration for detection and tracking of targets using multiple sensors. Attended weekly customer teleconferences to report status and review progress/achievement of goals.

- Wrote a distributed processing RPC (Remote Procedure Call) utility for legacy C++ programs to replace a malfunctioning CORBA system. Wrote a basic C++ -style parser for data objects, including templates-based code generation and compilation into specialized Java classes with Java Native Interface (JNI) calls for C++ & Java integration. Using Java RMI as a substrate, packaged C++ structures for network transport, marshalling and unmarshalling data and calling appropriate C++ methods on receiving computer in a thread-safe manner. Completed project in less than 100 labor hours and used it to create a cross-network graphical user interface in response to a customer requirement.

ORINCON, San Diego, California • 13 Years
Defense contractor with 350 employees.

Senior Principal Engineer
Completed software implementations to deliver algorithms on Unix computers in Fortran and C/C++. Performed data analysis/algorithm development using Matlab and Mathematica. Continually improved algorithms for signal processing, detection, classification, estimation, and tracking of sonar targets for U.S. Navy sonar projects. Tested algorithms and quantified results using recorded experimental data. Supervised several engineering teams to achieve project goals/benchmarks. Ensured successful delivery of several projects, including a 2-year medical image processing project that led to a U.S. patent application and a 2-year financial trading software automation for a top 5 U.S. mutual fund company.

- Over a two year period, re-wrote approximately 100,000 Java SLOC in a real-time high-speed financial trading application for one of the top-five US mutual fund companies. Specified the selection of production system computer hardware. Refactored Java code to include multiple threads for each trade and stage of execution, and converted fragile socket-based communication to robust RMI technique using multiple threads and FIFO buffers. Replaced Unix shell startup & shutdown scripts and wrote a distributed system startup/shutdown utilites in Java using RMI and multithreading. Updated real-time Swing GUI for operator display and control of trade processing. Introduced software configuration management (SCM) using CVS to project and trained team in its use. Introduced end-to-end regression testing and unit testing (JUnit) to project and trained team in its use. Added database logging/checkpointing of crucial trade records using MySQL.
- Played an integral role for 5 years in a company-wide software process improvement group that created processes and steps for SEI-CMM certification.
- Wrote company-wide coding standards for C, C++, and Java computer languages, as well as company-wide procedures for software configuration management (SCM) using CVS. Implemented Java & C++ style guides.
- Served as the primary Orincon representative for a $500M proposal by a group of 5 San Diego-based firms.
- Re-wrote real-time network communications software to make operations more robust and reliable.
- Created a single-sensor passive sonar (angle-only) tracking application in Matlab & Java, including graphical GUI for debugging and operator display. Processing included matrix manipulation & linear algebra, non-linear parameter estimation (e.g. range), Swing GUI display, and integration with existing legacy code. Junit/CppUnit testing was used extensively for development in an XP/Agile environment.
- Reduced clutter false alarms due to sidelobe detections by a factor of 10x by designing, implementing, and testing a sidelobe reduction algorithm.
- Decreased all clutter false alarms by a factor of 3x by conceiving a new MMSE-based speed estimation algorithm, and led a team to implement and test it.
- Boosted target/clutter classification performance by ~25% by conceiving and designing a continuous, probability-based vector classifier, and led a team to implement and test it.

KAMAK, San Diego, California • 4 Years
Defense contractor with 10 employees.

Research Engineer
Executed comprehensive planning, modeling, and simulation of air defense radars and surface-to-air missiles (SAMs), cruise missiles, and strike aircraft attempting to penetrate defended areas and suppress air defenses using bombs and high-speed anti-radiation missiles (HARM). Documented results in written reports.

- Designed graphical display software to depict terrain, defensive laydown, and radar visibility, with animation graphics that showed detailed progression of the air battle as it unfolded.
- Created a graphical, interactive flight-path selection tool for aircraft-waypoint selection and automated flight path generation using digital terrain elevation data (DTED).
- Invented new ways of displaying 3-D terrain and flight path and radar visibility information and increased speed and accuracy by automating manual procedures.
- Planned and simulated airborne strikes in a variety of land- and sea-based scenarios.

EDUCATION

MSEE, Electrical Engineering
UC San Diego, San Diego, California

BSEE, Electrical Engineering
UC San Diego, San Diego, California

SECURITY CLEARANCE
Top Secret/SCI With CI Polygraph

TECHNICAL EXPERTISE

Mathematics: Advanced Calculus, Linear Algebra, Numerical Methods
Electrical Engineering: Linear & Nonlinear Systems Theory, Random Processes, Estimation Theory, Kalman Filters/Extended Kalman Filters, Multi-Hypothesis Tracking, Queuing Theory, Detection Theory, Information Theory, Digital Communication Theory, Signal & Image Processing, Wavelets
Classification: Bayesian Estimation, Neural Networks, Radial Basis Functions, Fuzzy Logic
Software Engineering: Java/Groovy/Grails, C/C++/STL, Fortran/Basic/Cobol/Ruby, MySQL, Jini, RMI, JFC/Swing, Multi-Threaded Applications & Parallel Processing, Matlab, Mathematica, IDL, HDF4/HDF5, XML, JDBC, JNI, JMS, J2EE, CORBA, OOD/OOP, UML, Patterns/Anti-Patterns, Software Development Process (Coding Standards, Code Reviews, Configuration Management, Extreme Programming, Agile Development, Rapid Application Development, Refactoring, Test-first Programming, Database Organization & Programming, GUI Development.
Software Development Tools: Vi/Vim/GVim, Make, Ant/Gant, JUnit/CppUnit, Subversion/CVS, JProbe, Javadoc/doxygen
Computer Operating Systems: Unix/Linux/Solaris/Cygwin/VxWorks, csh(C-shell)/tcsh/bash/ksh, Microsoft Windows