Local business wins state award

Waimea company invents solution to $100 billion technical problem

Plum Hall Inc., based in Waimea, was named as the winner of the Exporter of High Technology award, a category in the Hawaii Governor's Exporter of the Year 2004 Awards program. The award was presented at a luncheon at Washington Place, Honolulu, by Gov. Linda Lingle to Dr. Thomas Plum, vice-president of technology and engineering for Plum Hall. Also credited, as sponsor of the High-tech Exporter, are Chuck Erskine and Carmela Boteilho of First Hawaiian Bank.

The computer "application" programs that people use everyday – Internet browsers, word processors, spreadsheets, etc. – were all written by expert computer programmers, using various other computer "tool" programs, and all those programs were written by other programmers, and so forth. The most fundamental "tool" programs are the "programming language compilers" which translate the human programmer's work directly into computer machine instructions. Plum Hall provides the programs that test the programming language compilers.

Unfortunately for today's computer users, some of the older programming languages still have little weaknesses, little vulnerabilities. Each year, the writers of viruses, worms, and other hacker attacks are finding more ways of exploiting these vulnerabilities. Worldwide, the annual cost of all these attacks was estimated to be between $120 billion and $150 billion last year.

Plum Hall's most recent project is a series of technologies to cure underlying causes of the vulnerabilities at the software foundation level. Once incorporated into the software development processes of corporations, Plum Hall's technologies provide heretofore

PHOTO SPECIAL TO NORTH HAWAII NEWS
Gov. Linda Lingle awards "High-Tech Exporter of the Year 2004" award to Thomas Plum and Lana Lee Plum of Waimea's Plum Hall, Inc.

impossible guaranties of quality, safety, security, and verifiability on both new and existing programs, while introducing little or no penalty to the performance of the software. This critical combination of safety, compatibility, and performance is a breakthrough, allowing safe and secure technologies to be used for all types of computer software, including operating systems (such as Microsoft Windows, Apple OS, and Linux), network software (such as Web and database servers), and embedded systems (such as medical monitoring software and life-critical systems). In other words, these technologies plug the holes that are the entryway for hackers.

That a small Hawaiian company can make such a contribution is possible because it addresses the fundamental root causes of these vulnerabilities: the most popular programming languages in the world, the languages in which the vast majority of commercial software is written, have the capability of interpreting input data as an executable program. It's a very

powerful facility and is integral to the high-performance and flexibility that make these languages so popular. Hackers scour popular software looking for places where this facility can be exploited. Once a vulnerability is discovered, it is a relatively simple matter to craft a virus or worm program that can take over the vulnerable machine at will.

Plum Hall's Safe-Secure technologies eliminate the buffer overflows, array-bounds mismatches, and other "undefined behaviors" that create such vulnerabilities.

The common wisdom has been that safe versions of the globally-dominant C and C++ programming languages would require crippling the language in some way: performance would suffer, it would be incompatible with the existing billions of lines of C/C++ code, at the very least, programmers would have to abandon some of their favorite techniques.

"Not so," said Thomas Plum. "It's time to make C and C++ as safe as any programming language can be. Previous attempts to solve the problem have been too unidirectional. These are

complex problems that cannot be solved by attacking them on a single front. Our Safe-Secure technologies integrate at various places in the software development process and at each place we take care of some aspect of the whole. Even though the technology is complex, we actually can make C and C++ safe and secure while retaining performance, flexibility, and compatibility with existing code."

Plum's claims are not those of a starry-eyed maverick. His knowledge of the intricacies of the C and C++ programming languages is virtually unmatched. He has been the convener, the United States' international representative, and the head of delegation of the International Standards Organization (ISO) Committee for C++, as well as a vice-chair of the USA's committee for C, and convener of the Ecma International Committee for the new C++/CLI. He has written four books on the C and C++ programming languages.

Plum Hall is a major supplier to the companies that manufacture the compilers that translate human-readable C and C++ code into executable machine language. Plum Hall's major line of business has been producing test suites that allow compiler manufacturers to confirm that what they are producing is, in fact, compliant with the C and C++ language standards. Plum Hall also produces test suites for Java, C# and C++/CLI.