

Please consider **TeK Associates** for selected embedded software development tasks involving Digital Signal Processing (DSP). **TeK Associates'** founder is a Ph.D. **electrical engineer** with over 36+ years of experience in the technology and applications of **Kalman filters** and in related Signal Processing (and in the underlying mathematics and software implementation). Our direct prior experience has been in Inertial Navigation Systems (INS), Radio Communications (e.g., JTIDS), and GPS navigation for both the **Navy** and for the **Air Force**, and in target tracking for strategic Early Warning Radars in national defense roles (e.g., SDI, NMD, UEWR). We also have had some experience in countermeasure considerations and have been involved with Independent Validation and Verification (IV&V) of Sonobuoy target tracking.

**TeK Associates'** founder has prior programming experience in **Assembly Language**, **PL/1**, and in **Fortran**, but now usually uses **Visual Basic** and **MatLab/Simulink** almost exclusively (as well as modules of our own **TK-MIP** software product, which is in Microsoft **Visual Basic**, now truly compiled using the same Microsoft compiler as is used for Microsoft's C/C++ Windows product). For the last four years, **TeK Associates'** founder has attended National Instruments' hands-on **LabView** and **Labwindows/CVI** workshops at Cummings Park in Woburn and has attended NI's associated **Developer Days** in Chelmsford, so he also has an awareness of what they are doing and some hands-on experience with it as well. **TeK Associates** also possesses The Mathworks' **MatLab-to-C cross-compiler** and we are aware of the excellent efficiency of **Blue Marble's** capability in automatically converting **Fortran code** to efficient **C code**. **TeK Associates'** founder used mainframes (and minicomputers) in the 1970's and early 1980's but our experience of the last 15 years has been exclusively on **Windows PC platforms**. The **MatLab/Simulink** (which **TeK Associates** owns) and **LabView/Labwindows/CVI** tools (that **TeK Associates'** founder is experienced with) can also be used to automatically generate **VHDL** code for embedded applications. The collection of target processors that are compatible with using this automated development path is continuing to increase. Microsoft's **Windows/CE** and other Microsoft Operating Systems for embedded applications continue to improve and become even more practicable as a lucrative alternate option that supports all the familiar development tools in **Visual Studio** and **.NET** (where **TeK Associates** has the bulk of its recent programming experience). We mention up front that we have not done any software development on **UNIX** machines in several years. Representative screen shots of our **TK-MIP** Software may be found at [www.TeKAssociates.biz/products.htm](http://www.TeKAssociates.biz/products.htm).

Other recent developments of likely interest that may aid in embedded and/or in multicore software development applications are:

1. Parallel architectures, like multicore computing, FPGAs, and high-speed buses, are redefining the way engineers and scientists build their test, embedded, and control systems. We are aware of the subsequent performance increase possibilities and the tools one can use to become proficient in parallel technologies. We follow the evolving capabilities and techniques of popular National Instrument (NI) software packages, such as NI **LabVIEW 8.5** featuring the new **LabVIEW Statechart Module** and "programming for multicore environments".
2. Important Fortran Updates (according to Jonathan Erickson, [jerickson@ddj.com](mailto:jerickson@ddj.com)): In an industry when things change at GHz speeds, there's solace in the permanence of tools like Fortran, which has been around since. John Backus spec'd out the "IBM Mathematical Formula Translating System" in the early 1950s, and delivered the first Fortran compiler in the late 1950s. **Absoft** recently announced in October 2007 that it has released the first commercial Fortran IDE for Windows and Linux (and MacOS is not far behind). The IDE, which comes bundled with **Absoft's Pro Fortran 10.1** tool suite, supports development for multi-core processor from **Intel** and **AMD** by providing auto-parallelization and auto-vectorization. According to **Absoft**, performance tests with **Pro Fortran 10.1** auto-parallelizing and auto-vectorizing compilers have demonstrated superscalar speed improvements on several industry benchmark programs. With the IDE, tools can be run from the GUI or the command line. It also accepts select third-party tools, such as compilers from **Apple**, **GNU**, and **Microsoft** and **VNI's IMSL** numerical libraries.

**TeK Associates'** founder's statement follows next:

I am intrinsically a software algorithm specialist and analyst. I am a senior member of the **IEEE** and have been chairman of the local Boston **IEEE** Control Systems Section twice (1990-92; 2002-2004). I'm also a member of **AIAA** (senior member), the **Institute of Navigation**, **ACM**, and **MSDN**. I'm also a life Member of the **National Defense Industrial Association**. I won the 1988 **M. Barry Carlton Award** for Outstanding Paper to appear in *IEEE Trans. on Aerospace and Electronic Systems* in 1987. I am a U.S. citizen and have had a **DOD** Secret clearance for 30 years until 2001 (when it lapsed while I was performing internal **TK-MIP** software development at **TeK Associates**).

I have previously been employed at **General Electric's** Corporate Research and Development Center in Schenectady, NY (1971-1973), **TASC** (1973-1979) in Reading, MA, **Intermetrics Incorporated** in Cambridge, MA (1979-1986), **Lincoln Laboratory of MIT** in Lexington, MA (1986-1992), and have owned my own small company, **TeK Associates** (1992-Present). I have also taught *Optimal Control* in the Graduate ECE Department of **Northeastern University** in the evenings for five years (1990-1995). At **TeK Associates**, I have had consulting and software development contracts from **MITRE**, **Xontech**, **Raytheon**, and **Arête**.

Best regards,

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