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/CV1 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.

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): 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,

Thomas H. Kerr III
Tel.: (781) 862-5870; e-mail: thomas_h_kerr@msn.com