

# Jacket for MATLAB®

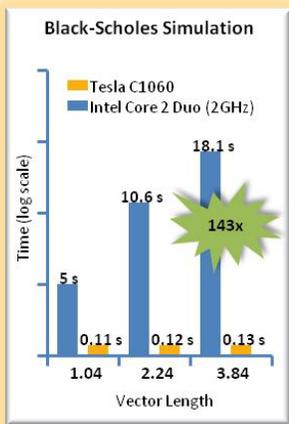
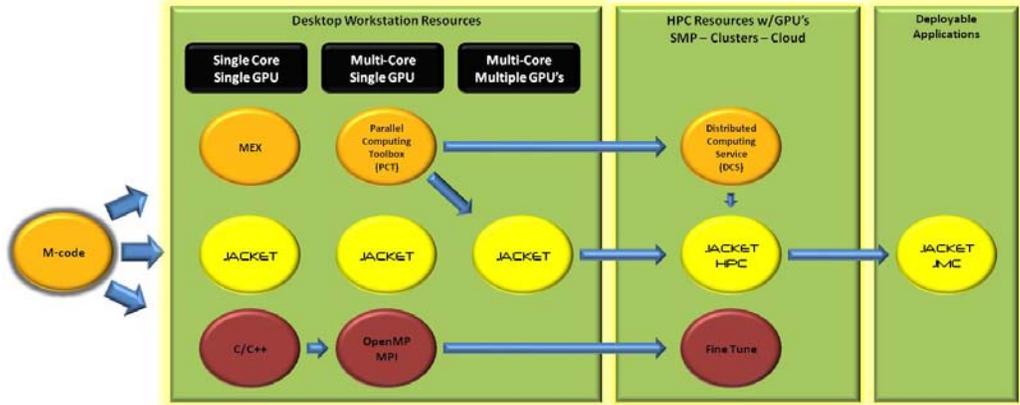
- **Jacket delivers value to engineers, scientists, and analysts and their organizations by:**
  - Enabling Innovation
  - Helping to create competitive advantage
  - Decreasing time-to-market
  - Lowering costs

- **Jacket capabilities deliver:**
  - A familiar programming environment based on the M-language
  - Extensive reuse of existing code
  - Maximum performance by leveraging GPU technology

The scale and pace of scientific and numerical computing tasks have outgrown single processor desktop systems. While multi-core systems, servers, clusters, and the cloud offer solutions for the largest scale problems, the programming complexity of these systems has not become simple nor inexpensive. *Jacket* is a programming platform that allows engineers, scientists, and analysts to extend the capabilities of desktops by leveraging the “graphics processing unit” or GPU that is a standard component of modern systems. GPUs contain 100s of cores of computational power that up until now have been underutilized by technical computing applications.

The productivity boost brought by *Jacket* to teams of MATLAB-skilled domain experts is matched by the economic benefits of getting the most out of the computing resources available. *Jacket* eliminates the need for intermediate steps of reprogramming algorithms and applications in C, C++, Fortran, or other programming languages. While parallel programming tools are becoming more available to domain experts and MPI remains the dominant methodology to develop parallel applications, *Jacket* provides a simpler path for scientists, engineers, and analysts to achieve greater performance, using GPUs as the work horse to deliver results.

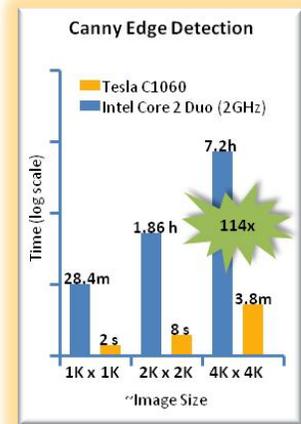
Optimizing M-code for performance can take many paths. Up until now, compiling to MEX or reprogramming to C/C++ has been prominent for single CPU systems. As multi-core and multi-CPU systems have been adopted, MATLAB users have turned to PCT and DCS for parallel execution while C/C++ users have had to adopt MPI or OpenMP. Even with enhanced parallel tools, parallelization is difficult and time consuming and is completely focused on the CPU. *Jacket* offers performance and productivity enhancements to augment parallelization efforts or to simply improve performance with existing computational resources.



*Jacket* provides a level of productivity and return on investment far beyond any other development platform on the market. While there are many tools that enable performance improvement, *Jacket* delivers performance at a whole new level by unleashing the power of GPUs to deliver maximum FLOPS per dollar.

With minimal knowledge and time, single threaded M-codes are transformed to GPU-enabled applications that fully leverage hardware within the enterprise. Single and multiple GPU systems can be leveraged to delay the cost, time, and investment needed to migrate to HPC resources. Where HPC resources are already in place, *JacketHPC* can be leveraged to harness the power of 10s to 100s or more GPUs available in servers, clusters or Cloud services.

Finally, *Jacket* delivers the ability to deploy compiled applications with JMC such that the largest number of users can benefit from the performance gains and insight intended by the original application. Performance, productivity, and leveraging existing assets make *Jacket* a highly valuable platform for organizations of all sizes.



## Product Overview

Jacket is a software platform specifically designed for engineers, scientists, and analysts who need maximum application performance, with minimal programming difficulty, while leveraging all technical computing resources available, including laptops, desktops, servers, clusters and the Cloud. The Jacket platform consists of a runtime and language processing system that automatically optimizes existing applications or new algorithms for GPU computing.

Jacket currently supports the MATLAB language as a frontend to the platform. MATLAB is the technical computing language of choice across a broad range of industries with over 1 million users. Jacket's language processing system automatically translates MATLAB code to high performance primitives required for best utilization of GPUs. Working in concert with the translation system, Jacket's runtime system optimizes memory transfers, compiles code on-the-fly for realtime tuned performance, and launches GPU kernels efficiently for maximal performance. All GPU-specific programming details are handled by Jacket, freeing the user to focus on science, engineering, and analytics.



Jacket introduces new data types to MATLAB which let the user move data and computations to the GPU. Changing the data type allows the user to tap into the GPUs tremendous computational power. Nvidia's Tesla C1060 contains 240 cores that are now fully accessible with Jacket!

Example MATLAB code:

```
>> G = gones( 3 ); % Create a GPU matrix
>> G = fft( G ); % Perform a GPU FFT
>> G = G * G; % GPU Matrix Multiply
>> C = double( G ); % Bring back to CPU
```

Optional capabilities are also available with Jacket, including a Developer SDK, multiple GPU support for clusters, and a Compiler that enables the creation of executables for license-free deployment of applications.

- The Developer SDK makes integration of custom CUDA code into Jacket's runtime very easy. With a few simple SDK functions, your CUDA code can benefit from the optimized Jacket platform.
- Seamless utilization of multiple GPUs either in the same machine or across a network is available with the [JacketHPC](#). In many cases, little to no code revision is required to take advantage of this parallel computing capability. Multiple and simultaneous Jacket sessions across a server or cluster are also supported with this option.
- When Jacket applications have completed the development, test and optimization stages and are ready for deployment, the [Compiler option](#) allows users to generate license-free executables for distribution to larger user bases.

AccelerEyes, based in Atlanta, Georgia provides a variety of support and services for its customers. In addition to traditional product documentation, an active User Forum and many application examples are available on the company website. Optional software maintenance and phone support are also available. Contact AccelerEyes or an authorized partner for additional information on Jacket, optional products or other company support and services.



75 5<sup>th</sup> Street NW, Suite 204, Atlanta, GA 30308 • Phone: +1.800.570.1941 • [www.accelereyes.com](http://www.accelereyes.com)

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