

# SmartKernel

## Ada95 / Embedded

### Core Services Provided

- Threads
- Schedulers
- Timing
- Memory Allocation
- Basic IO
- Health Monitoring

### Standards and Support:

- Safety and Security Support
- DO-178B Level A Certified
- EN50128 SIL4 Certified
- ARINC-653 API compliance
- MOPS for ACR compliance
- Memory Partitioning Support
- Time Partitioning Support

### SmartKernel Configurations:

- SmartKernel Ada95/Embedded
- SmartKernel OS653 (interface)
- SmartKernel C/C++
- SmartKernel Java/Embedded
- SmartKernel Java/Cert
- SmartKernel Ada83/Cert
- SmartKernel Ada95/Cert
- SmartKernel Ada95/Native

### SmartKernel™ Ada95/Embedded

SmartKernel Ada95/Embedded is a robust engineering tools environment kernel for developing hard real-time applications, supporting the full Ada95 language. SmartKernel Ada95/Embedded for PowerPC cross development environment is hosted on Microsoft Windows workstations and supports cross development tools for targeting the PowerPC processor and boards.

The SmartKernel Ada95/Embedded development environment includes a full Ada95 optimizing compiler, host-target connectivity, library managers, project managers, and productivity toolsets that include a language sensitive editor, interactive cross referencer, build utility & cross debugger.

The heart of the Ada95/Embedded environment is the high-performance SmartKernel product. Scaleable, multi-tasking support coupled with fast, deterministic performance and robust technology makes the SmartKernel Ada95/Embedded product a reliable solution for Ada95 real-time development. Additionally the SmartKernel Ada95/Embedded is offered with source navigation tools, advanced language sensitive editors

and optional testing tools for increased application quality.

### SmartKernel: Safety and Security in a Single Kernel

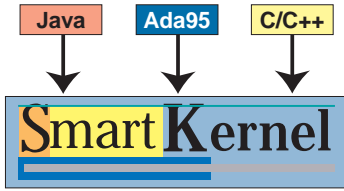
SmartKernel provides a fast, efficient, safety and security certified kernel that supports language-specific, higher-level operating systems. Certified to the FAA's DO-178B Level A and an ARINC-653 interface, SmartKernel provides time and memory protection through partitioning. SmartKernel enables multiple applications to safely run on a single board and supports applications involving multiple safety

CONFIGURATION	SmartKernel OS	Java JVM	C++	Ada95
	ARINC-653	Java/Embedded	Generic OS	Ada95/Embedded
Application Software Interface				
<b>Enabler</b>				
Firmware Interface				
Firmware				
Hardware Resource				

levels on a single board. Using language-specific enabling technology, SmartKernel also supports all of today's more popular programming languages.



**Making Ideas a Reality**



# SmartKernel

## Ada95 / Embedded

### Layered Architecture

Architecturally, SmartKernel's core, known as the Enabler, sits directly between the hardware/firmware resources and the application software interface. The Enabler consists of a thin portable operating system enabling layer that provides just those primitive features necessary to implement a language-specific operating system or full general-purpose OS. Because of its small size, the SmartKernel core is easily certified to both safety and security standards to support certification of the higher level operating systems and applications. Operating systems and applications utilizing the primitives provided by the Enabler easily port to new boards and architectures.

### Safety and Security

SmartKernel is built from the ground up to satisfy the strictest standards for both safety and security. The small size of the SmartKernel Enabler makes it more easily contained for certification documentation, traceability and formal coverage testing. The Enabler is certified to the

FAA's DO-178B Level A commercial avionics standard, EN50128 SIL4, and can be certified for compliance with other safety and security standards.

Language-specific kernels or general OSs are then certified to these same criticality standards. Certification is more easily accomplished since the core OS enabling features are certified in the lower-level Enabler leaving less to certify in the higher-level kernels. Certified kernels are available for Java, C/C+ (via ARINC-653), Ada83 and Ada95.

Built-in partitioning support within SmartKernel ensures that each higher-level kernel (partition) needs to be qualified only once because it is protected from having its execution affected by development or changes within other partitions. This reduces the cost of testing, qualification, and certification.

### Time and Memory Partitioning

The SmartKernel core fully supports time and memory partitioning, enabling multiple higher level kernels to be isolated from each other. In addition to protection of the entire

### Other Support:

- Flexible toolset packaging for every level of development need
- Board Support Package (BSP) sources provided for user customization
- Real-time kernel sources available

system from an error in one of the applications, this capability provides out-of-the-box support for multiple safety and security levels on a single board or architecture.

SmartKernel supports:

- Multiple Language Kernels/ Executives on a single board
- Multiple Applications on a single board
- Time and Memory Protection Between Applications/Kernels
- Safety and Security Protection Between Applications/Kernels

### SmartKernel Strengths

Thanks to its architecture, SmartKernel provides for:

- Smaller kernels,
- Faster kernels,
- Highly portable kernels, and
- Highly portable user applications.

To obtain more information, please contact Aonix at [www.aonix.com](http://www.aonix.com) or your local Aonix office.

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