Green Hills®
SOFTWARE

General Dynamics UK Selects Green Hills Software for British Army's Specialist Vehicle Programme

Green Hills®
SOFTWARE
CELEBRATING
30 YEARS

INTEGRITY
Most Reliable and Secure
Operating System

INTEGRITY-178B
Only Operating System
Certified to EAL6+ and
DO-178B, Level A

MULTI®
Development Tools with
World's Best Debugger

DoubleCheck
Integrated Static Analyzer
Find Programming Errors Early

TimeMachine
MULTI Debugging Suite
Find Every Bug in Minutes

GateD®
Routing & Switching

C • C++ • Ada Compilers
Optimizing Compilers for the
Fastest and Smallest Code

Green Hills Software has been chosen by General Dynamics UK as the operating system software for all the mission-critical computers of the Scout Specialist Vehicles (SV) programme, which General Dynamics UK is developing during the demonstration phase of the programme. Green Hills Software's MULTI® integrated development environment (IDE) has also been selected to build the application code that runs on top of the INTEGRITY operating system on all the computer subsystems in the vehicle.

Scout SV is a new generation military armored vehicle family that comprises several variants built on a common base platform. Initial variants include the Scout reconnaissance vehicle, Recce Armored Personnel Carrier, repair vehicle, and recovery vehicle. All will share an open electronic architecture, making the Scout SV fleet easier to maintain, simplifying user training and playing a key role in lowering costs throughout the planned 30-year life of the vehicles.

The four main electronic subsystems on Scout SV will use Intel Core i5 and Core i7 multicore architectures running Green Hills Software's INTEGRITY RTOS and each has its own display. These are used by the driver, commander and gunner; and there is one additional terminal. The subsystems support all critical services including driving controls, defensive aids, navigation tools, 'friend or foe' recognition and visual displays. The latter can receive live feeds from up to seven video cameras and real-time performance is essential in order to avoid motion sickness that can result from inconsistencies between visually and physically perceived information.

Christopher Smith, vice president marketing, Green Hills Software, said, "INTEGRITY is field-proven in the most demanding military and avionics applications on land, sea and air. We are very pleased to be involved in the SV program, which will afford the highest level of protection and support to British soldiers and, potentially, to those of other allied forces around the world."

The demonstration phase of the project will see the development of seven prototypes for the Scout reconnaissance vehicle and supporting variants. ■

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INTEGRITY-178B High-Assurance Multi-Secure RTOS Supports Multicore Processors

Raising the bar

Green Hills Software, the proven worldwide leader in FAA/EASA- and NSA-certified high-assurance operating systems, announced that its newest version of the INTEGRITY-178B RTOS supports multicore processors with initial availability on Freescale Semiconductor's family of QorIQ processors. Green Hills has raised the bar by offering the embedded computing markets a safety- and security-critical operating system for multicore processors from a trusted and reliable supplier of high-assurance operating systems.

This update of INTEGRITY-178B maintains its exceptional support for robust partitioning, yet now provisions this fundamental multi-level-secure operating system requirement across multiple cores in an operating environment that supports the combination of Asynchronous Multiprocessing (AMP) and Symmetric Multiprocessing (SMP), by utilizing a patent-pending approach to multicore processor scheduling, defined as Time-variant Unified Multiprocessing (tuMP, pronounced "2-MP").

Solving a fundamental problem

For developers of real-time embedded computing systems with security- and/or safety-critical computing requirements, the advent of multicore processors has created a fundamental problem: how to develop, integrate or port previously independent applications running on single-core processors to an operating environment where these independent applications operate on a processor containing two or more independent processing cores with shared system resources. Several multicore operating system paradigms have been developed in the past, including Asymmetric Multiprocessing (AMP), where each core runs a completely independent executable; Symmetric Multiprocessing (SMP), where an executable is designed to make use of multiple

cores simultaneously; and combinations of both (some cores used for AMP, other cores used for SMP). The rigidness of these usage paradigms is evident when attempting to integrate additional applications into a multicore processor-based platform.

Building on a 10-year certification pedigree

Green Hills latest version of INTEGRITY-178B builds upon a verifiable ten-year service history and certification pedigree in critical airborne avionics, communications and flight control systems by adding new state-of-the-art operating system capabilities for multicore processors. This new functionality enables multiple independent safety- and/or security-critical applications to execute on a multicore operating environment in a predictable and bounded manner. These new INTEGRITY-178B capabilities naturally include support for AMP and SMP, yet provide multicore control such that the application independence is retained even when sharing a processor's multiple cores and other system resources.

Another dimension to partition scheduling

Since any single core in a multicore processor may provide more execution capabilities than any single application requires, and since some of these applications may be designed to utilize multiple cores simultaneously, Green Hills has added

another dimension to its partition scheduler design that efficiently and practically utilizes multicore processors. This new and innovative scheduling method, tuMP, results in a single OS (i.e. unified) that provides practical time variant scheduling of both AMP and SMP applications simultaneously by enabling the association of cores and applications into groupings (called Affinity Groups) corresponding to some intended function (or functions).

These Affinity Groups define how cores will be utilized by one or more applications, with the Affinity Groups (grouping of cores and applications) being permitted to vary over time. Affinity Groups may be scheduled independent of other Affinity Groups, permitting time-lines that closely correspond to application requirements, yet also permitting other sets of Affinity Groups to be developed that can make use of any of the time windows where cores are not being utilized. Any new application (or extension of an existing application) can make use of the unallocated execution time across the entire multicore processor.

Initial supported targets

With its groundbreaking tuMP operating system scheduling approach for multicore processors, INTEGRITY-178B extends partitioning support beyond single-core processors, ensuring this highly flexible capability can continue to be effectively used to host multiple applications while preserving resources for application growth without concern about future availability of new single-core processor designs. INTEGRITY-178B for multicore architectures is initially available for Freescale Semiconductor's family of QorIQ processors with P4080 support available first. INTEGRITY-178B is also available with Green Hills Software's MULTI/AdaMULTI™ integrated development environment (including optimizing C, C++ and Ada95 compilers). ∎