**ECHIDNA™: A RECONFIGURABLE REAL-TIME OPERATING SYSTEM FOR EMBEDDED PROCESSORS**

**OBJECTIVE**
To further develop Echidna™, a reconfigurable Real-Time Operating System (RTOS) for embedded processors.

**MOTIVATION**
Reconfigurable software is cheaper to develop and easier to maintain. Thus, Echidna™ reduces the complexity of programming embedded systems on DSPs & microcontrollers, making telecommunications software development faster, easier, and cheaper.

**WHY RTOS?**
- Hardware Abstraction
- Simpler Virtual Machine
- Code Re-use
- Multiple Processes / Threads
- Task Scheduling
- Real-Time Guarantees
- Hardware Abstraction
- Multiple Processes / Threads
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**Digital Signal Processors vs. Microcontrollers**
- DSPs are excellent for computationally-intensive tasks, such as filtering and FFT
- DSPs are much faster than microcontrollers, especially for mathematical operations.
- DSPs are good for moving large amounts of data, since they have separate program and data buses.
- Microcontrollers are excellent for control applications, such as interfacing with sensors and actuators.
- Microcontrollers have many general-purpose and specialized I/O ports, including serial, PWM, CAN, A/D, and timer functions.
- Better compilers for microcontrollers than DSPs.

**“I STILL KNOW WHAT YOU DID LAST SUMMER”**
- Hardware/Software co-design of I/O devices and device drivers
- Enhanced configurability for improved software reuse
- Implemented semaphores for periodic execution
- Provide new data types for manipulation of streaming data (e.g., audio & video)
- Integrated control and communication
- Created an experimental testbed for a wireless network of sensors & actuators

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**ECHIDNA™ Dependency Tree**

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