

THEMIS

RTEMS (<http://www.rtems.com>) is an Open Source RTOS providing a powerful development and run-time environment that promotes the production of efficient real-time embedded applications.

Features:

- Scalable Architecture
- Modified GPL License
- Multiple APIs - Classic, POSIX, ITRON
- Event-driven multitasking
- Priority-based, preemptive scheduling
- Responsive Interrupt Management
- Optional Rate Monotonic Scheduling
- Priority Inheritance and Ceiling Protocols
- Intertask communication and synchronization
- Homogeneous and heterogeneous multiprocessor systems
- Reentrant ANSI C Library
- Add-on libraries including Python, Lua, and Tcl
- High performance BSD TCP/IP Stack
- Protocols: TCP, UDP, BOOTP, ARP, ICMP
- Servers: FTPD, HTTPD, TELNETD
- Clients: DHCP, NTP, DNS, TFTP

Processors Supported:

M680x0	ix86	Coldfire	ARM
M683xx	Pentium	MIPS	Blackfin
PowerPC	SuperH	SPARC	H8
NIOS2		SPARC64	

Available Services:

- Training
- Standard Support
- Legacy Support
- RTEMS Application Assistance
- Board Support Package Development
- Application Design and Development
- Ports to New Architectures
- System Architecture Design

On-Line Applications

Research (OAR) Corporation

7047 Old Madison Pike
Suite 320
Huntsville, AL 35806
<http://www.oarcorp.com>
Phone: 256-722-9985
Fax: 256-722-0985

NASA's Time History of Events and Macroscale Interactions during Substorms (THEMIS) aims to resolve one of the oldest mysteries in space physics, namely to determine what physical process in near-Earth space initiates the violent eruptions of the aurora that occur during substorms in the Earth's magnetosphere. THEMIS is a 2-year mission consisting of 5 identical probes that will study the violent colorful eruptions of Auroras.

Understanding and predicting space weather is important to describe the environment in which spacecraft and astronauts operate and ensure their safety. Just as hail and tornadoes accompany the most severe thunderstorms, substorms accompany the most intense space storms – those that disrupt communications, cause power line transmission failures, and produce the most penetrating radiation. THEMIS will study substorms to gain insight into the most severe space storms.



The Bus Avionics Unit (BAU) provides numerous functions for the Probe Bus and contains the flight computer for the Satellite. The BAU provides for the processing of all the data handling, internal communication interface, instrument electrical interface, and power control for the Probe Bus. The BAU contains five modules with the top module containing a radiation hardened main processor (Cold Fire Processor operating at 16.78 MHz).

This module performs all the onboard processing and data handling. It contains 64 MB of bulk memory and supports a 2.1 Mbps data rate interface with the instrument electronics. The BAU hosts RTEMS and the application control and data handling software for the Probe Bus. The BAU consumes less than 7.0W and is only 3.0 kg.



The Explorers Program Office at Goddard Space Flight Center, Greenbelt, Md., manages this NASA-funded mission. The University of California, Berkeley's Space Sciences Laboratory and Swales Aerospace, Beltsville, Md., built the THEMIS probes.

References:

- Themis NASA Home Page
- http://www.nasa.gov/mission_pages/themis/main/index.html
- THEMIS ATK Home Page
- http://www.atk.com/sa/bus_offerings/Bus_Offerings_THEMIS.asp
- Wikipedia Page
- [http://en.wikipedia.org/wiki/THEMIS_\(satellite\)](http://en.wikipedia.org/wiki/THEMIS_(satellite))
- RTEMS Wiki Page
- <http://www.rtems.com/wiki/index.php/THEMIS>