

## Planck

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
- 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

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Launched 14 May 2009, the Planck mission will collect and characterize radiation from the Cosmic Microwave Background (CMB) using sensitive radio receivers operating at extremely low temperatures. These receivers will determine the black body equivalent temperature of the background radiation and will be capable of distinguishing temperature variations of about one microkelvin. These measurements will be used to produce the best ever maps of anisotropies in the CMB radiation field.

The Planck spacecraft is 4.2 metres high and has a maximum diameter of 4.2 metres, with a launch mass of around 1.8 tonnes. The spacecraft comprises a service module, which houses systems for power generation and conditioning, attitude control, data handling and communications, together with the warm parts of the scientific instruments, and a payload module. The payload module consists of the telescope, the optical bench, with the parts of the instruments that need to be cooled - the sensitive detector units - and the cooling systems.

Planck will provide a map of the Cosmic Microwave Background (CMB) field at all angular resolutions greater than 10 arcminutes and with a temperature resolution of the order of one part in 106. The simultaneous mapping of the sky at a wide range of frequencies will enable the separation of the Galactic and extragalactic foreground radiation from the primordial cosmological background signal.

Planck will help provide answers to some important questions: how did the Universe begin? How did it evolve to the state we observe today? How will it continue to evolve in the future? Planck's objective is to analyze, with the highest accuracy ever achieved, the remnants of the radiation that filled the Universe immediately after the Big Bang, which we observe today as the Cosmic Microwave Background.

The Planck Spacecraft Management Unit (SMU) was built by Saab Ericsson Space. The SMU's Processor Module is built around a SPARC V7 processor, the TSC695F, and custom I/O ASIC.

### References:

- Planck Home Page
  - <http://sci.esa.int/science-e/www/area/index.cfm?fareaid=17>
- RTEMS Planck Wiki Page
  - <http://www.rtems.org/wiki/index.php/Planck>
- RTEMS SMU Wiki Page
  - <http://www.rtems.org/wiki/index.php/SaabSMU>

