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**FIRST IP-POWERED WIRELESS SENSOR NETWORK
BRINGS PHYSICAL DATA INTO DIGITAL ENTERPRISE**

***Arch Rock 'Primer Pack' Deploys in an Hour
As Web Services Platform for Easy Sensor Application Development***

SAN FRANCISCO, Calif., Oct. 30, 2006 – Arch Rock Corporation has introduced the first wireless sensor network that can be accessed and operated as a full-fledged member of the IT infrastructure, allowing enterprises to use standard Internet management tools to gain visibility and control down to the level of individual sensor nodes.

Arch Rock Primer Pack is a complete wireless sensor network (WSN) that is simple enough to be deployed in an hour as a pilot network in a factory, office building or data center, yet sophisticated enough to be seamlessly integrated into enterprise applications as a set of standards-compliant web services.

Using Arch Rock's powerful APIs (application programming interfaces) and working in their development environment of choice, users can rapidly create custom applications to monitor physical conditions without doing the cumbersome embedded programming typically required to build sensor network applications. Sensor data becomes immediately available to the plant manager or field worker on his mobile device of choice, or to the office worker in his web browser or enterprise planning application (e.g., ERP or DSS).

Through an unprecedented level of IP and web services integration, Primer Pack gives users full access to embedded WSN services through common IT methodologies. Individual sensor nodes can be assigned IP addresses, DNS names and web pages, and can be directly managed using pervasive IP tools such as SNMP, ping and traceroute. Standard Internet provisioning and troubleshooting techniques, as well as authentication and other security measures, can be applied to single nodes, groups of nodes or the entire WSN.

Wireless Sensor Network: No Longer an Internet Outsider

Dr. David Culler, Arch Rock founder and chief technology officer, said, "Sensor networks in the past have been approached as technology 'islands,' divorced from the broad

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set of widely-used Internet standards. Primer Pack uses those standards as the basis for bringing the sensor network into the web services environment and integrating it with enterprise applications. For the first time users can access and remotely manage the sensor network just as they would any other networked device.

"In addition, there's been far too much 'assembly required': users have been left on their own to pull together the elements of WSNs – microcontrollers, radios, wireless protocols, interfaces, commissioning and management tools – and then tediously hand-code their applications. As a turnkey, customizable WSN system, Primer Pack eliminates these obstacles and fully incorporates the physical world of sensors into the digital world of IT."

"Users have been waiting for a sensor network solution that requires no training to set up or write custom applications, yet doesn't compromise functionality," said Arch Rock CEO Roland Acra. "Pilot networks created with Primer Pack can help enterprises in fields as diverse as manufacturing, retail, energy management and freight logistics to build and test applications or model an environment's RF characteristics, paving the way for a smooth large-scale production rollout. For wireless device developers and IT system integrators, Primer Pack provides a service-oriented architecture (SOA) platform to assess the functionality and performance of their solutions in advance of customer deployments."

Components of Arch Rock Primer Pack

Primer Pack is a complete out-of-the-box WSN application platform that monitors physical conditions in a wide variety of environments.

Primer Pack components are:

Arch Rock Gateway Server. The Gateway Server connects via Ethernet to the enterprise LAN, translating embedded applications into web services and providing a web-based console for setup, diagnostics and management of the WSN. Playing multiple roles – as an IP router, DNS server, HTTP server, SNMP agent – the Gateway lets users generate a deployment map; discover, register, move and configure nodes; enable or disable sensors; graphically display statistics on node reliability and performance; show node battery status; request data from individual nodes or groups; set reporting intervals, thresholds and alerts; and numerous other functions. Each page of the console offers a brief "How to build this page" tutorial showing the REST API or SOAP calls that perform particular tasks.

Arch Rock Bridge Node. This node provides industry-standard IEEE 802.15.4 wireless radio communication between the gateway and the sensor nodes.

Arch Rock Sensor Nodes. Six battery-powered sensor nodes – miniature computers that incorporate TelosB-compatible industry-standard motes – monitor temperature, light and humidity, communicating with one another and the Gateway Server over a self-organizing IEEE 802.15.4-based wireless network. Arch Rock's robust TinyOS operating system, low-power mesh networking protocols and embedded web services software maximize performance and reliability.

Expansion Ports for external sensors. Users can choose from among thousands of types of common sensors/switches/actuators beyond those provided on the Sensor Nodes to augment the basic functions of Primer Pack. New sensors are easily added using pre-installed sensor drivers, with no system programming necessary.

Web Services. A comprehensive set of web services lets users create applications to retrieve data from the WSN and control its functions. Rather than having to write embedded code at the sensor node, users work at the web services layer using REST and SOAP interfaces, and choosing from an extensive list of popular application-development and management environments (e.g., WebSphere, Visual Studio, J2EE, OpenView, .NET) and standard languages (e.g., Java, C, C#, Perl, Visual Basic).

Key Arch Rock Enabling Technologies

As the first product Arch Rock has brought to market, Primer Pack showcases major advances in several areas of wireless sensor networking technology, including IP integration, sensor node software, wireless mesh networking, power efficiency and embedded web services.

Primer Pack sensor node software is the first commercial implementation of TinyOS 2.0, the latest version of the de facto standard embedded operating system created specifically for sensor networks. Arch Rock has enhanced TinyOS 2.0 for increased robustness and energy-efficiency, allowing it to conserve maximum power even while remote wirelessly-connected nodes maintain a high level of responsiveness. The hardware independence designed into TinyOS 2.0 means the sensor node hardware can be unbundled and coupled with multi-vendor sensor node hardware offerings (e.g., microcontroller and radio chips from Intel, Texas Instruments, Atmel, Ember) to let Arch Rock, OEM or system integrator partners create wide-ranging future solutions geared to specific applications.

To meet low power-consumption requirements yet achieve highly reliable, efficient and scalable meshed wireless communication, Arch Rock has created breakthrough network protocols on top of the IEEE 802.15.4 radio standard. The company's innovative link-layer protocol implements the concept of "passive vigilance," which allows sensor nodes to "sleep," using minimum energy, while remaining responsive to "wakeup calls" from the network when data need to be collected or alerts generated. At the network-layer, distinct protocols enable triple redundancy in the data-collection path, directed routing to task a specific node with an action, "density-aware" dissemination for reliable propagation of small objects throughout the network, and over-the-air (OTA) programming and provisioning for disseminating large objects such as major system software updates.

In the embedded services area, Arch Rock's Gateway Server seamlessly plugs embedded applications into web services, effectively turning the sensor network – or the

individual sensor node – into an IP appliance. While other vendors' browser-based WSN interfaces simply present the look of web services without a way to influence and manipulate the data, Arch Rock provides a richly configurable web services interface that lets users reach directly into the sensor nodes to process and manipulate data-collection and reporting parameters.

Pricing and Availability

Available immediately, Arch Rock Primer Pack is priced at \$4,995 and comes with a Gateway Server, Bridge Node, six Sensor Nodes, expansion ports, and all necessary software, including preinstalled drivers for external sensors and a complete set of web services and Gateway Server APIs. Users can purchase additional Sensor Nodes for \$275 each. Each node can support up to six external sensors.

About Arch Rock Corporation

Arch Rock was founded in May 2005 to bridge the physical and digital worlds by bringing data gathered by wireless sensor networks (WSNs) into the enterprise IT infrastructure, where it can be easily viewed, analyzed and managed. The company's founders came from the University of California, Berkeley, and Intel Research, where they did seminal work on three generations of wireless sensor nodes ("Berkeley motes") and created the leading operating system for sensor networks, TinyOS. Arch Rock WSN products are used in environmental monitoring, industrial automation, tracking and logistics, and many other applications. The privately-held company, based in San Francisco, has raised an initial round of venture funding from New Enterprise Associates, Shasta Ventures and Intel Capital. For more information, visit <http://www.archrock.com>.

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