Applications

- Weather Monitoring
- Water Quality Monitoring
- Air Quality Monitoring
- Biotelemetry
- Imagery and Audio Capture
- Earthquake Monitoring
- Buoy Networks / Tsunami Warning
- Emergency Telemedicine and Disaster Response

InteleMote™

The InteleMote is a TCP/IP-enabled, programmable, rugged outdoor data acquisition device with built-in GPS module, sensor power management, and a wireless mesh network transceiver providing communication links of up to 6 miles line of sight between stations. The InteleMote, like the InteleCell™, is true multi-protocol router that can be used for acquiring information from a wide variety of sensors with different hardware interfaces and speaking different software protocols simultaneously. The InteleMote acquires sensor data and logs it in its internal flash memory. It wakes up periodically to automatically form a wireless mesh network with other InteleMotes to route their data to a point of Internet access. An InteleMote can get Internet access through many means including built-in Wi-Fi, external cellular or satellite modems that plug directly into one of the device ports, or an InteleCell network within wireless range. The data is sent over the Internet to the Intelesense Data Exchange where the results can be accessed by users via Portals.

Applications for the InteleMote include environmental monitoring, medical monitoring, emergency telemedicine and disaster response in a variety of extreme environment conditions. The InteleMote was mainly designed for applications where there are multiple locations within a relatively small area that require only a few sensors at each node or measurement location. Two examples are vital signs monitoring of soldiers or firefighters, and CO_2 and soil moisture monitoring on fields and in green houses. Both instances benefit from the small size, low cost, and versatile sensor interface of the InteleMote.

Mesh networks of InteleMotes positioned over short distances can also be integrated with long-range mesh networks of InteleCells. These InteleMotes can serve as companion devices to the InteleCell while the InteleCell acts as a communication relay for the InteleMote network. This is especially useful in situations where these devices do not have Internet access but still need to perform a number of sensing operations. In this case, one or more InteleCells can be used to set up a communications backbone to the area, allowing the InteleMotes to route their data to the Intelesense Data Exchange. Data from the Intelesense Data Exchange is aggregated with over 2.1 million data layers with the results displayed on portals that can be accessed by any computer, smart phone or tablet device.

Each InteleMote has two sensor ports: one serial (RS-232) port, and one analog port. Each port can provide continuous power and switched power to attached devices. Both ports also feature programmable I/O lines, and an interrupt input pin.

The wireless transceiver inside each InteleMote is a 900MHz mesh networking module that provides up to 6 miles line of sight links between stations when using high-gain antennas (1.8 miles with dipole antennas) links when using high-gain antennas. Further, each device has a long battery life through a synchronized sleep mode. In addition to the 900MHz Transceiver, each InteleMote has a built-in 802.11b Wi-Fi module and web server for data access via Wi-Fi enabled devices like laptops and smart phones. This module is also used by the InteleMote to access the Internet or to talk to Wi-Fi enabled sensors.

The InteleMote also has a GPS module that is used to automatically locate itself anywhere in the world. This module also acts as a backup time-keeper in case synchronization to the rest of the network is temporarily lost. This feature in combination with periodic synchronization of the network with the time on Network Time Servers on the Internet or the Intelesense Data Exchange ensures that every InteleMote in the network is always time-accurate.

TECHNICAL SPECIFICATIONS

OPTIONS
IM-NG-S
InteleMote Standard Edition

FEATURES
External Ports
2 (1 Serial, 1 Analog)

Wireless Interfaces
Wi-Fi 802.11b, 900MHz mesh networking module
(2.4GHz available on request)

Wired Interfaces
RS-232, SPI

GPS
Built-in GPS Module, Capable of SBAS (WAAS,
EGNOS, MSAS)

Keypad
None

LCD Display
None

PORTS
Serial Port
RS-232, Switched and continuous DC power (5V..12V
programmable), 2 analog inputs, and 1 interrupt input

Analog Port
Switched and continuous DC power (5V..12V
programmable), 2 analog inputs, and 1 interrupt input

Expansion Port (Internal)
SPI Interface, analog inputs, GPIO lines, power

POWER
Power Options
NiMH Batteries (2xAA) recharged by optional panel/
charger, Rechargeable by External battery pack
in combination with solar panel, wind turbine, or
hydrogenerator

Input Voltage (Vin)
1.8..5.5V DC

Operating Current at Vin=2.6V
Sleep: 1mA, Doze: 6mA, Awake & Idle: 600mA, Peak
w/o sensors: 800mA, Max input current: 3A

Output Power to Ports (Vout and Iout)
Output Power to Ports 5V..12V 4.5W max

MEMORY
On-Board Storage
8MB Flash

Removable Storage
USB Flash Memory (Up to 4GB)

MESH RADIO
Frequency Band
900 MHz ISM

Interference Immunity
FHSS (Frequency Hopping Spread Spectrum)

Transmit Power
250 mW (+24dBm)

Indoor/Urban Range
1000ft (305 m)

Outdoor/RF Line-of-Sight Range
Up to 4 miles (6.5km) w/2.1dB Dipole antenna, up to 6
miles (9.6 km) w/high gain antenna

Receiver Sensitivity
-100 dBm

RF Data Rate
200 kbps

Encryption
128-bit AES

Wi-Fi
Protocol
802.11b

Encryption
WEP, WPA-PSK Personal or Personal TKIP, 256-bit AES

Network Modes
Ad hoc, Infrastructure

Supported Features
Port and Network Configuration, Sensor Data Display,
Firmware Update

SUPPORTED SENSORS
Weather
Vaisala WXT520, Onset Computers Hobo weather
stations, Davis Instruments ProVantage 2, Intelesense
Radiation Sensor, Temp./RH

Water
Global Water WL400 and WL450 stage, In-Situ
LevelTroll 500 stage, YSI 6000 series water quality
sondes, EnviroTechMicroLAB

Gases
Vaisala CO2, Gastech Genesis, Intelesense CO, SO2,
NO2, NO, PH3, H2S, O2, Cl2, LEL, C2H4O, HCN

Soil
Decagon Soil Moisture and Soil Temperature Sensors,
Decagon Drain Gauge, Irrometer Soil Water Potential

Medical
Polar Heart Rate, Nonin Pulse Oximeter, Body
Temperature, ECG, Propaq, Zephyr

Wildlife Tracking and Trapping
InteleTrap

Video
InteleCam2

Other Sensors
Generic voltage sensor, Generic switch sensors, High
voltage and High current sensors, Custom sensors
easily supported with custom drivers (open API and
open source)

MECHANICAL
Dimensions
127mm x 76mm x 32mm (5"x3"x1.25")

Weight (excl. batteries)
150g (5.4 oz)

Operating Temperature
-20°C to 70°C(-55°C to 70°C with battery heater)

Enclosure Options
Optional IP66 Weatherproof NEMA Enclosure available

Certification
MIL-STD-810G compliant (Methods tested: 501, 502,
503, 507, 509, 514, and 515)

Intelesense Technologies provides global integrated monitoring products and services for environmental, public health, and other data. Intelesense develops technologies for real-world wireless sensor networks for air, water, weather, and imagery that communicate their data over the Internet from anywhere in the world, integrates with data from many other sources automatically, and provides real-time advanced visualization. This global InteleNet forms an integrated georepository of all relevant information for a particular region. At the same time it provides wireless communication infrastructure for remote areas.

Intelesense Technologies was founded to enable worldwide integrated monitoring of the environment and its inhabitants. A global network of wireless sensors that are integrated with many other data sources helps to better understand their interrelationships. The InteleNet technology is currently deployed in multiple sites around the world including multiple sites in Hawaii, the continental US, Africa, the Middle East, and Asia. Planning for future deployments in other areas of the world is currently underway.

Intelesense currently has a corporate office in Honolulu, Hawaii; Research and Development offices in Silicon Valley in California; and field offices with collaborative partners in each of the deployment zones listed above.

Current projects range from protecting some of the most beautiful and biodiverse places on our planet, to tracking emerging infectious diseases, to helping children from around the world to connect and interact with each other, and better understand their environment.