



### 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



## IntelCell™

The IntelCell is a rugged, wireless TCP/IP enabled, programmable data acquisition device with built-in GPS module, sensor power management and a number of wireless and wired interfaces. As a true *multi-protocol router for sensor data*, it can be used for acquiring information from a wide variety of sensors with different hardware interfaces and speaking different software protocols simultaneously. The IntelCell acquires unstructured data and combines the results into one TCP/IP data stream. This data is then sent to the Intelesense Data Exchange servers over the Internet from where it can be accessed by users via secure online Portals. Further, IntelCells can access the Internet either through its built-in Ethernet or Wi-Fi interface, or via external cellular or satellite modems that plug directly into one of the device's ports.



The IntelCell can either be deployed with sensors for long-term, unattended monitoring in the field, or serve as a handheld data acquisition device for manual sampling. Its architecture and large number of supported interfaces also make it an ideal gateway for joining many wired and wireless interfaces. Applications include environmental monitoring, medical monitoring, emergency telemedicine and disaster response, as well as a stand-alone wireless communications infrastructure for remote areas with extreme climate conditions. The IntelCell is able to extend any TCP/IP network, such as the Internet, into very remote areas where no other infrastructure is readily available.

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

The IntelCell features two wireless transceivers: a 900MHz module for long-range mesh networking between IntelCells (up to 40 miles range), and a 900MHz lower power module for connecting the IntelCell to IntelMote networks (up to 6 miles range).

In addition to the two 900MHz transceivers, each IntelCell has a built-in 802.11b Wi-Fi module and web server for configuration and data access via Wi-Fi-enabled devices like laptops and smart phones. The Wi-Fi module is also used by the IntelCell to get access to the Internet, or to communicate with Wi-Fi-enabled sensors.

The IntelCell also contains a GPS module and automatically locates itself anywhere in the world. The GPS 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 IntelCell in the network is always time-accurate.

# TECHNICAL SPECIFICATIONS

## OPTIONS

**IC-NG-S** IntelCell Standard Edition

**IC-NG-E** IntelCell Extreme Cold Edition

## FEATURES

### External Ports

6 (3 Serial, 3 Analog)

### Wireless Interfaces

Wi-Fi 802.11b, 900MHz 1W and 250mW mesh networking modules (2.4GHz available on request)

### Wired Interfaces

RS-232, SPI, USB Host, Ethernet

### GPS

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

### Keypad

5-Button membrane keypad

### LCD Display

20x4 character LCD display w/ backlight

## PORTS

### Serial Ports

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

### Analog Ports

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

### USB Host Port

Typically used for long-term data storage, but can also be used to interface to USB-based sensor/actuator devices

### Expansion Port (Internal)

SPI Interface, Analog Inputs, GPIO lines, Power

## POWER

### Battery

Rechargeable Li-Ion 3.7V/9600mAh (built-in)

### Input Power

7V...24V DC, 1.5A max.

### Operating Current

Sleep: 2mA, Doze: 6mA, Awake & Idle: 350mA, Peak: 1.2A

### Output Power to Ports

5..12V, 4.5W max

## MEMORY

### On-Board Storage

8MB Flash

### Removable Storage

USB Flash Memory (Up to 4GB)

## LONG-RANGE MESH RADIO

### Frequency Band

900 MHz ISM

### Interference Immunity

FHSS (Frequency Hopping Spread Spectrum)

### Transmit Power

1W (30dBm)

### Indoor/Urban Range

up to 3000' (900 m) w/ 2.1dB dipole antenna

### Outdoor/RF Line-of-Sight Range

up to 14 miles (22km) w/2.1dB dipole antenna, up to 40 miles (64km) w/high-gain antenna

**Receiver Sensitivity** -100 dBm

**RF Data Rate** 125 kbps

**Encryption** 256-bit AES

## SHORT-RANGE MESH RADIO

### Frequency Band

900 MHz ISM

### Interference Immunity

FHSS (Frequency Hopping Spread Spectrum)

### Transmit Power

250 mW (+24dBm)

### Indoor/Urban Range

1000 ft (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

Adhoc, 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, Irrrometer 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

190mm x 178mm x 46mm (7.5" x 7" x 1.8")

### Weight

920g (32.5 oz)

### Operating Temperature

IC-NG-S: -20°C to 60°C

IC-NG-E: -70°C to 60°C

### Enclosure

Weatherproof enclosure (IP67)

### 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 IntelNet 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 IntelNet 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.



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