

Intelligent Sensing For the Connected World



ToI4IoT

Things of internet for internet of things

Bluetooth Low Energy (BLE): What It Is & What It Is NOT - 1

- Personal Area Network Solution
- BLE is Bluetooth Protocol Optimized and Simplified for Duty-Cycled Operation with Simplified Profiles
- BLE is LOW ENERGY but not necessarily LOW POWER
- Useable Transmission Payload: 20 Bytes Net
- Update / Transmission Rate: Typically 50 payloads per second (every 20ms)
- Some solutions go up to 300 payloads per second (non-compliant)
- Ideal for Personal Data Consumption in Close Proximity Applications
- Not Optimized for Audio or Video: Optimized for Condensed Data Delivery
- Ideal for Monitoring and Control of Systems Using Mobile Devices
- Capable of up to 7 Simultaneous Connections (BLE 4.0)
- Some Flood Meshing Available by Add-Ons and Modifications:
 - On February 24th, BLE Special Interest Group Announced the Availability of Standard Mesh in the BLE protocol by 2016



Bluetooth Low Energy (BLE): What It Is & What It Is NOT - 2

- BLE 4.0 Offers Master & Device Configuration
- BLE 4.1 Offers Interchangeable Master & Device
- BLE 4.1 Offers LOW ENERGY as an Option Only
- BLE 4.1 Offers Dedicated Device Channels (Precursor to IPv6 Adoption)
- Devices: Sensors and Other Data Sources
- Masters: Usually Access Points, Hubs but Mostly Mobile Devices

MAJOR APPLICATIONS:

- Allow Data Access from Any Device on Mobile Handsets and Tablets
- Bridge to Any Device Which Processes Data At the Edge of Physical World
- Point to Point Communication – No Network Necessary

SUMMARY:

- **BLE IS THE STARTING POINT OF PERSONAL AREA IoT**
- **BLE CONNECTS THE PHYSICAL WORLD TO THE DIGITAL WORLD**

Use Cases

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Stationary

BLE integrated in the Stationary equipment, carries collected data

BLE serves as a data presentation channel to an operator's mobile handset (No need for dedicated monitor, etc.).
No Network!...



Portable

BLE integrated in Custom Portable Equipment Such as a Portable Keypad

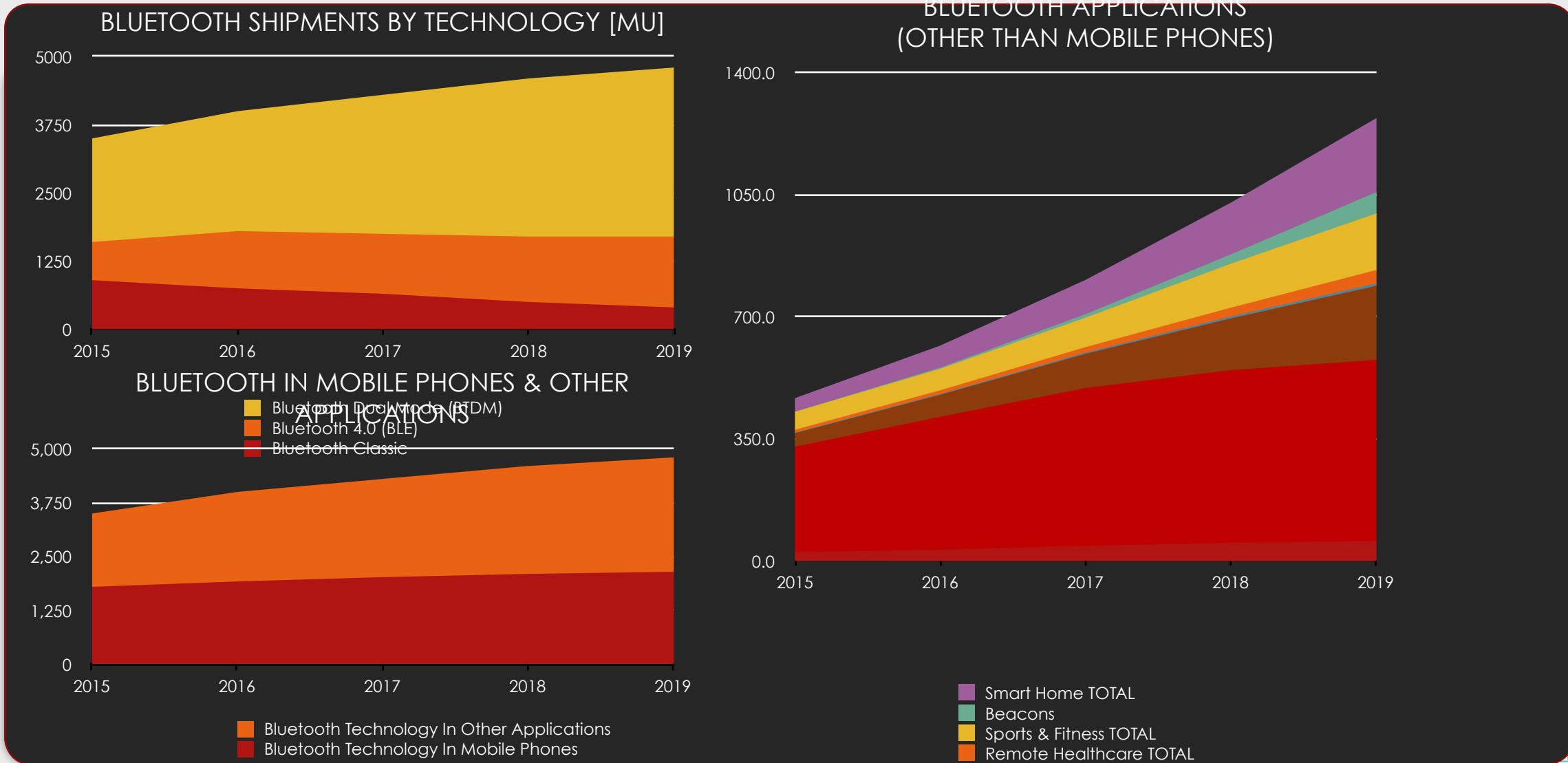
Energy Efficient, point to point Communication Between a Custom Portable and Any Other Mobile or Stationary Device – No Gateway!...



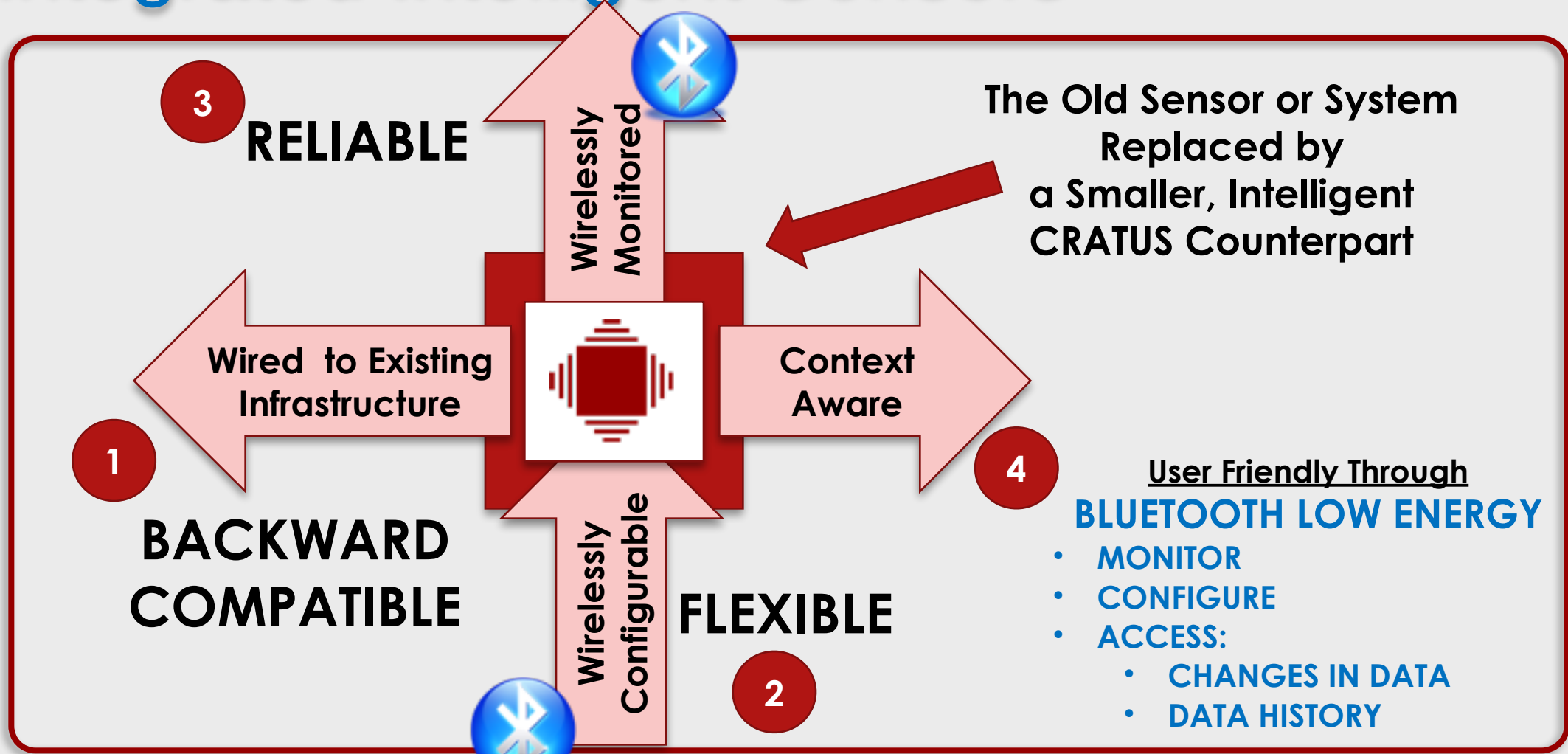
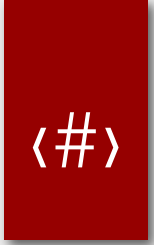
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BLE Market Landscape

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CRATUS Bluetooth Low Energy Integrated Intelligent Sensors



CRATUS Position in Sensing

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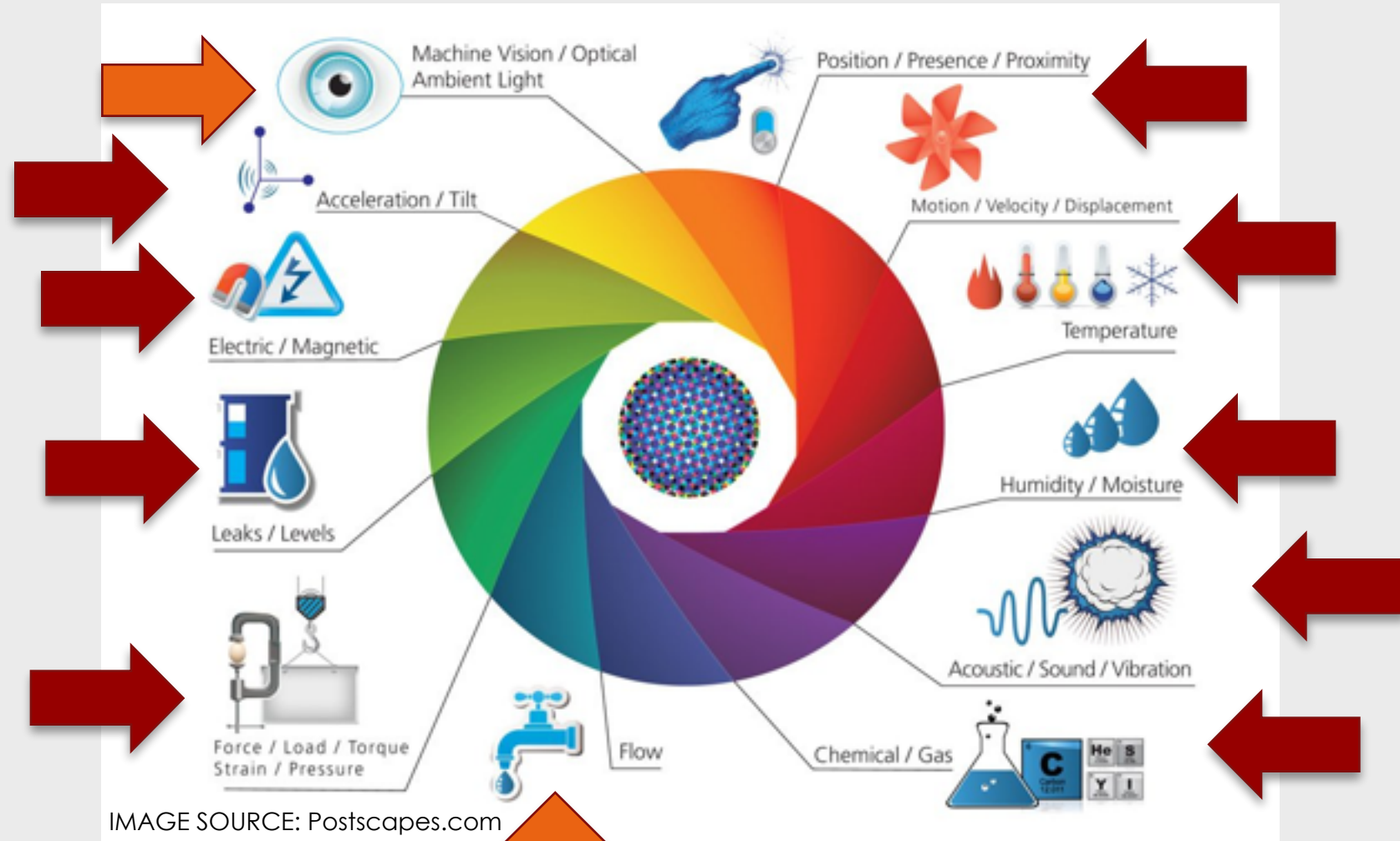


IMAGE SOURCE: Postscapes.com

➔ NOW

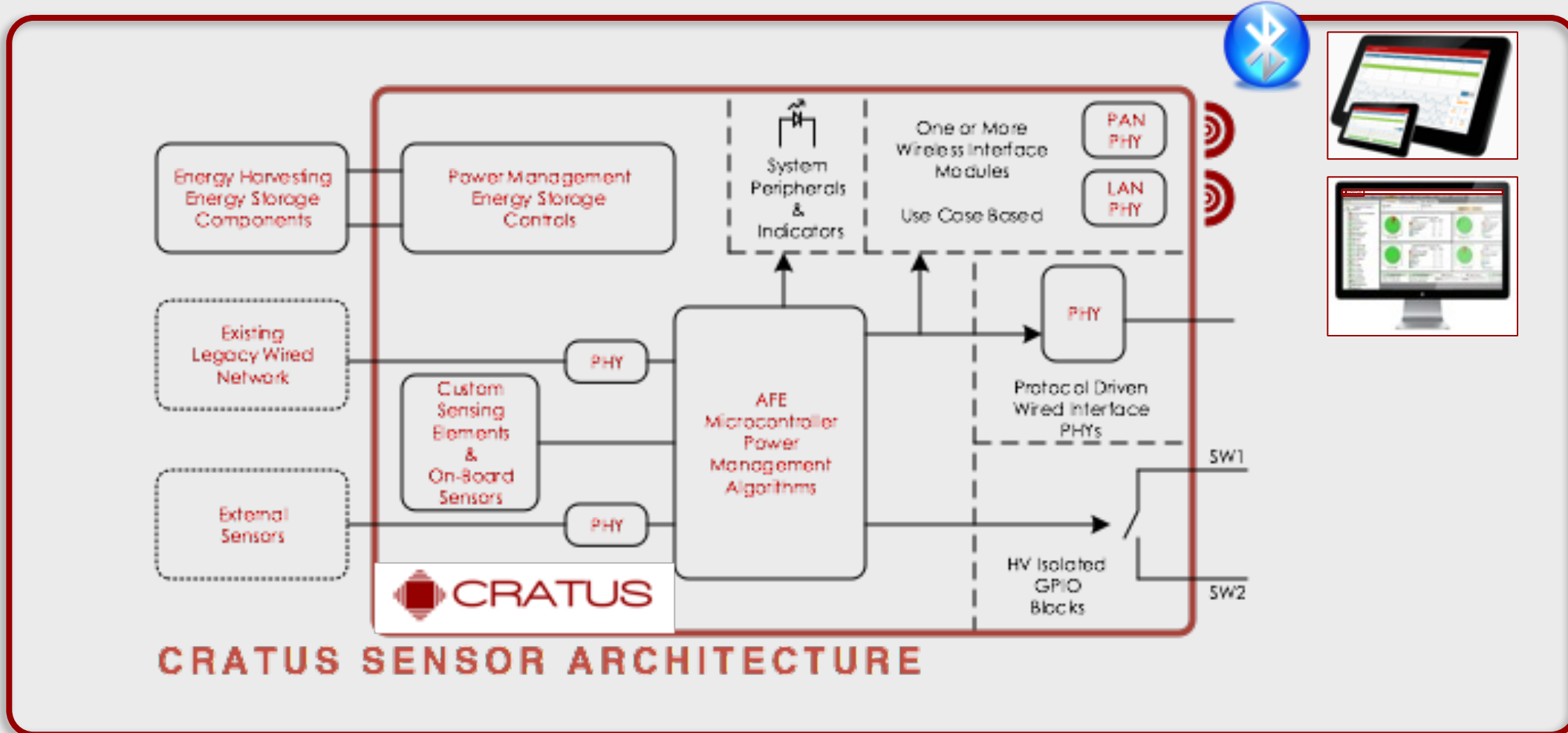
➔ FUTURE

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Custom Sensing Solutions

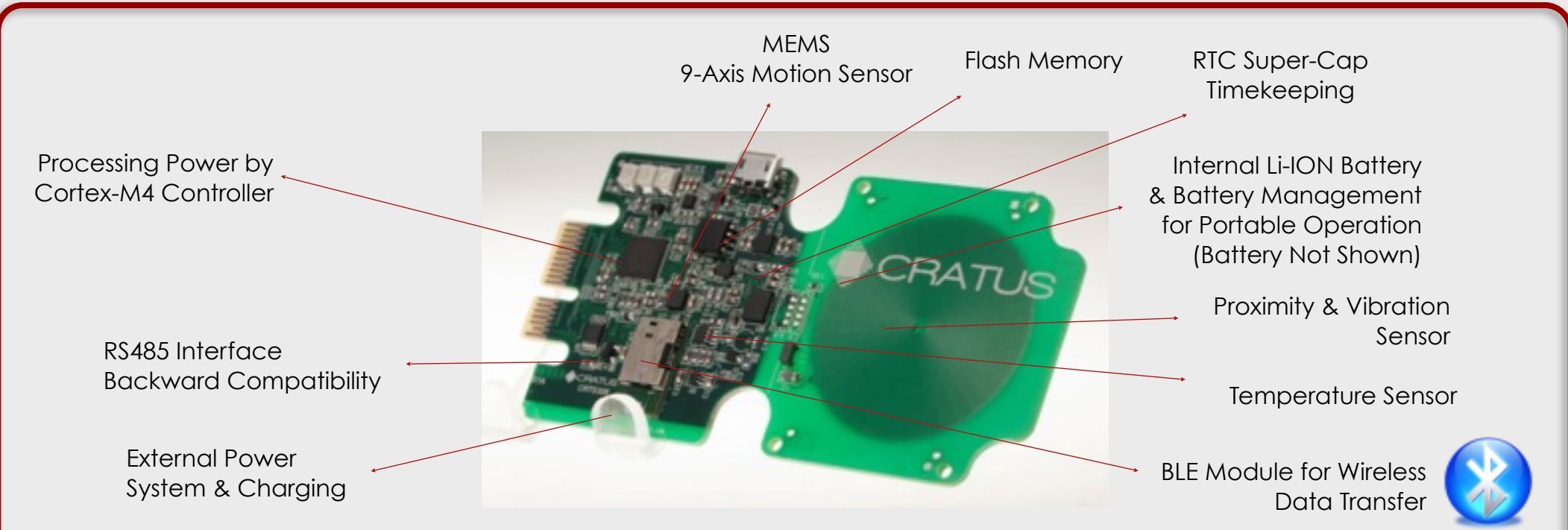
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Product Example: CRTS308

Sensor Fusion Development Platform

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- General Proximity, Temperature & Vibration Sensing
- Surface Telemetry
- Predictive Maintenance of Automation Systems
- Motion Sensing for Linear or Rotational Systems
- Position Sensing for Linear or Rotational Systems
- Extensible to Pressure, Force, Load & Torque Measurement

- Mobile Application:
- View Data
 - Monitor System
 - Configure Parameters
 - Present Data to Server



CRTS30x Differentiation

Sensor Fusion Platform Competitive Landscape

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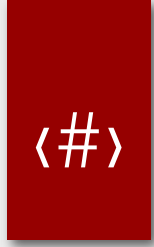
CRATUS provides custom solutions for high value markets. We believe "context" is defined by solving the challenge in hand by designing around and optimizing:

- 1) Function
- 2) Performance
- 3) Data & Power Efficiency
- 4) Form & Industrial Design
- 5) User experience

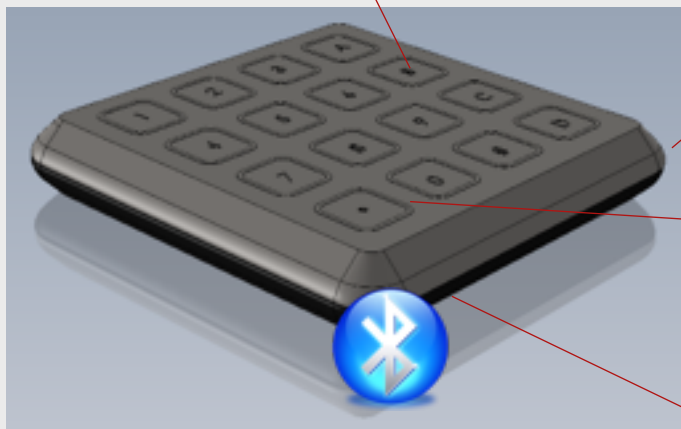
These priorities which we follow translate the inspiration to the product

| | Company A | Company B | Company C | CRATUS |
|--------------------------------------------|-----------|--------------|--------------|-----------|
| Multiple Market Sensor Clusters | X | - | - | X |
| Market Specific Interface PHYs | X | - | - | 2 |
| Number of On-Board Sensors | 5 | 2 | 2 | 3+ |
| On-Board Wireless Interface | - | X | X | X |
| On Board Controller | Add-On | - | - | Cortex M4 |
| Dedicated Mobile App | - | - | X | X |
| Custom Enclosure Offered | - | - | - | X |
| Serial Interface Development Board | Add-On | - | - | Included |
| Li-Poly System Battery | - | Support Only | Support Only | Included |
| Back-Up RTC Super Capacitor | - | - | - | X |
| System Memory (Excluding uC) | - | - | - | 32Mb |
| File System & Data Base Support | - | - | - | FAT32/DB |
| Smart Beacon Mode | - | - | - | X |





Rugged Construction
Single Piece Metal Face Plate
316L Stainless Steel
7075 Aluminum



Two-Piece Construction:

Detachable Keypad
Completely Sealed Electronics
& Sensing Elements
For In-Panel Operation

Detachable Backpack
Power, Battery & Wireless
Communications
Portable Operation



16 Force Sensitive Button Keypad
Completely Sealed & Rugged Construction
UART, USB, RS232 or RS-485 Output PHY
Options

Optional Micro-Perforated Keypad
Built-In Memory
Authentication Functions

Features:
No Moving Parts
Resilient to Shock & Vibration
Vandal Proof
IP67 or Higher

