



cognitive
systems corp.

Enabling Technologies for Spectrum Operations

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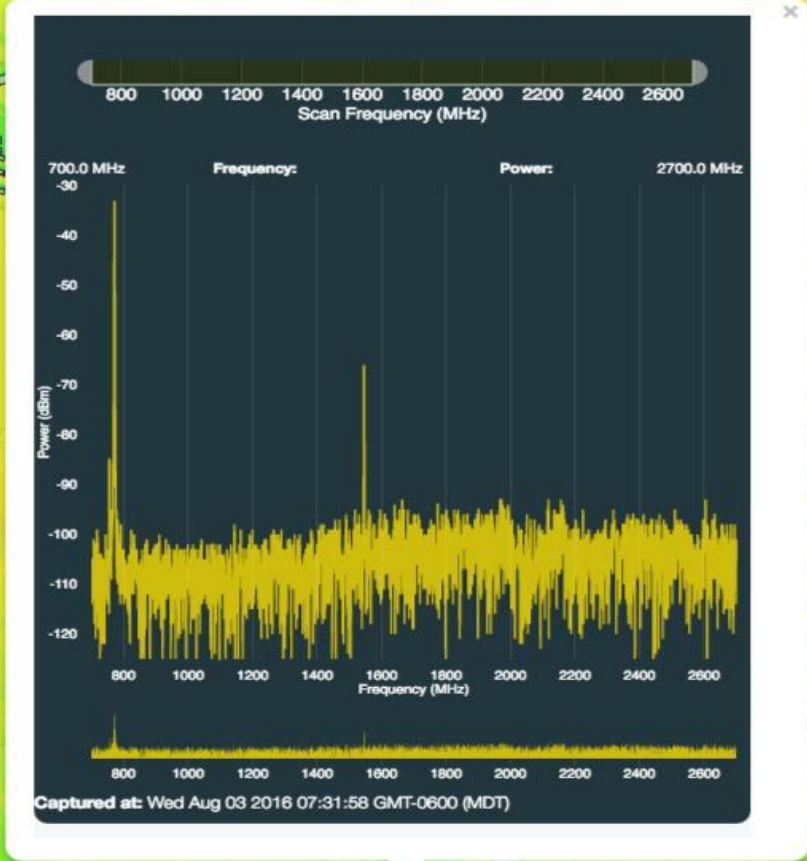
SPECTRUM OPERATIONS

- Instrumented nation
 - Informed spectrum management
- Instrumented coasts and borders
 - Autonomous anomaly detection
 - Distributed radio algorithms
- Instrumented battlefields
 - Enhanced RF situational awareness
 - ISR sensor-actuator networks





Menu



012326a8fed05b0dee
RSSI = -91 dBm

Drive Test Data

Cell Towers

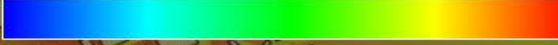
Freq Range: 850 - 900

- Load Waterloo Towers
- Load all visible Towers
- Clear Towers

Heatmap

X10 Backend: Waterloo (silicon10)

-100 Heatmap Range -30



Opacity: 0.7
Animate:

- Load Heatmap
- Clear Heatmap

Ameras

Myst Backend: Development

- Clear All Ameras
- Discover Ameras
- Load Cloud Demo
- Load Sensor Network Demo
- Add Virtual Amera

RSSI Range: 800 - 850

- Start RSSI Stream
- Stop RSSI Stream

Probes

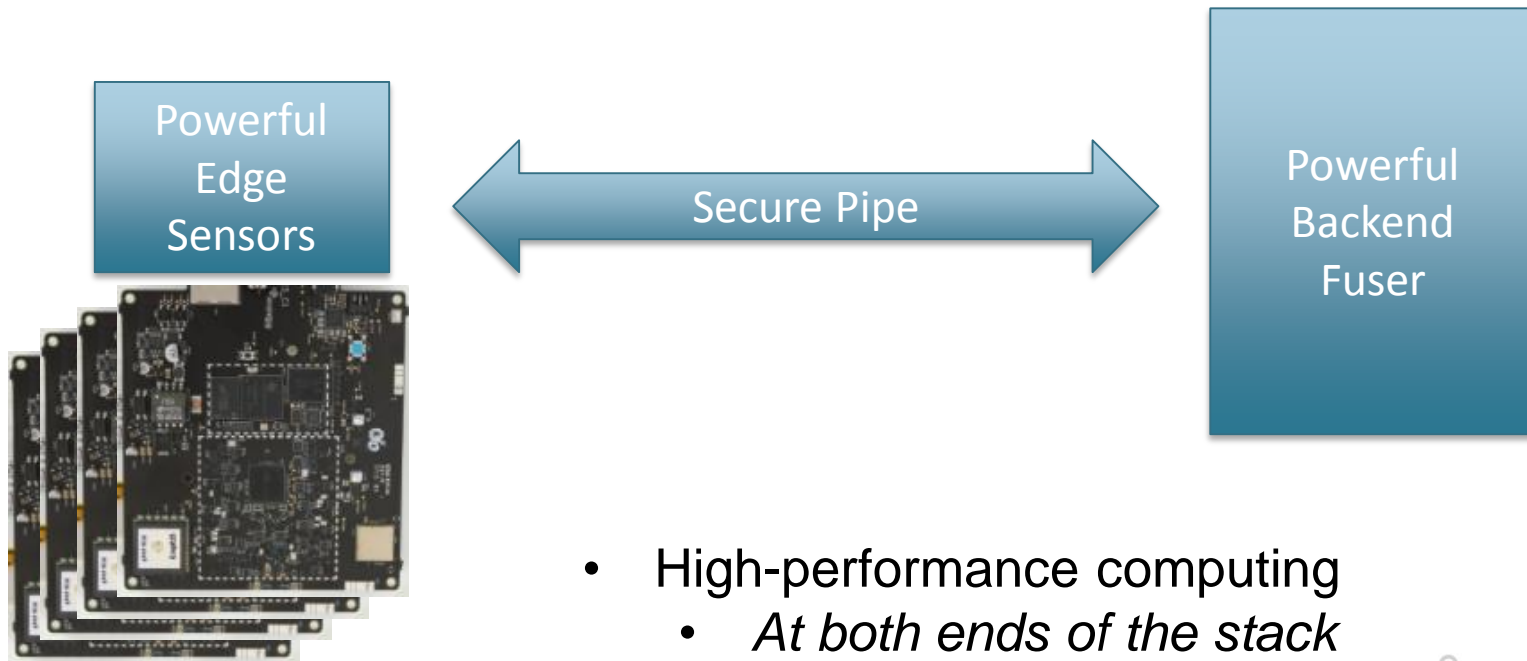
- Add Probe
- Clear Probes

Debug

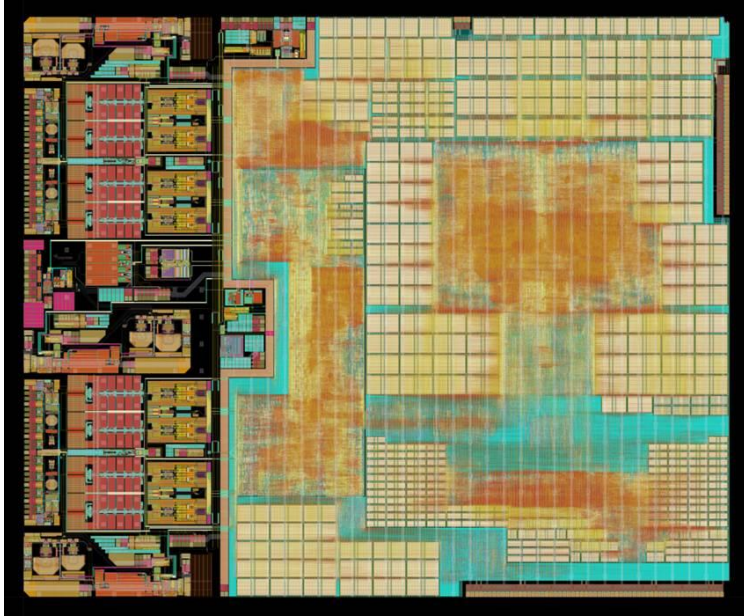
DENSE RF SENSOR NETWORKS

- High-resolution Low-latency RF Situational Awareness
- Compress the sense-act loop
- Implications
 - Economics
 - Sensor-Actuator Node Costs
 - Network Charges
 - Performance
 - Security

ENABLING TECHNOLOGY



COGNITIVE SDR-ON-CHIP



RF/analog/digital front end

+

High-bandwidth compute engines

- Keep IQ on chip
- On-chip: Analyze, Demod, De-FEC
- Send reports, not samples

BENEFITS

- Performance
 - Real-time, Low-latency, High-bandwidth
 - Low-power (2 W wide-band spectrum sensing)
 - Highly-flexible *software-defined radio on-chip*
 - Very low algorithm implementation overhead
 - Autonomy: No external host computer needed
- Economics:
 - Control node cost
 - Control network charges
 - IQ stays *within* the radio IC
 - On-chip *computed intelligence* goes to the cloud



SECURE SENSOR NETWORK

- High-performance *implies* responsibility
 - Want situ-awareness *not* another attack vector
 - Secure tasking
 - Secure reporting
- Backend fusion
 - RF propagation-aware
 - Supercomputer-enabled