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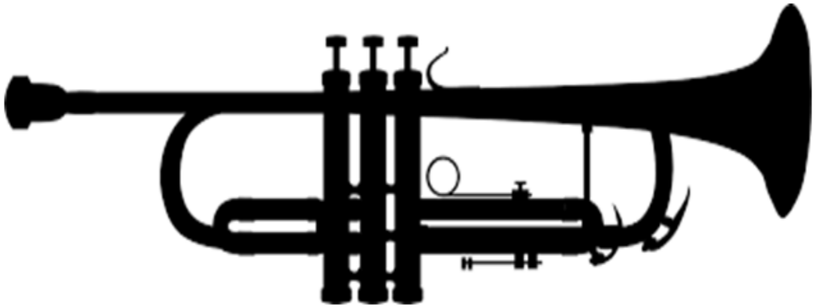

Spanish: The bell-shaped end of a musical wind instrument

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Our Story

Before Pabellon …at least it's how we remember it

The Magnetic Pathway

Tech Sprint 1 (founding team funded) → **Tech Sprint 2 (accelerator seed funded)** → **Tech Sprint 3 (supplemental investor funded)** → **Tech Sprint 4**

- **2Q12** – Pabellon born a Delaware C **Corp**
- **3Q13** – Successful **Proof of Concept** for Power Transfer
- **2Q14** – Extreme Manufacturing **Miniaturization** Achieved
- **3Q14** – Portfolio of Engineering Units for **Power Transfer Developed**
- **1Q15** – Sprint 2 Provisional Patents Filed
- **2Q15** – Market Size and Use **Case Validation**
- **3Q15** – Utility **Patent** Prosecution Initiated
- **4Q15** – **Successful** Engineering Units for Data Transfer
- **1Q16** – Multiple Provisional Patents converted to utility patents

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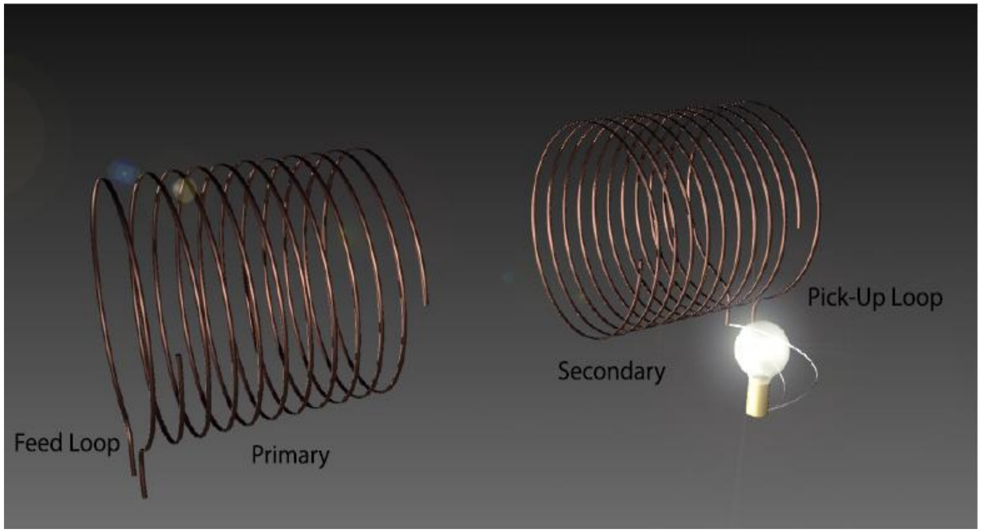
Tesla's Vision

Никола Тесла



"**When wireless is perfectly applied** the whole earth will be converted into a huge brain, which in fact it is, all things being particles of a real and rhythmic whole. We shall be able to communicate with one another instantly, irrespective of distance. Not only this, but through television and telephony we shall see and hear one another as perfectly as though we were face to face, despite intervening distances of thousands of miles; and the instruments through which we shall be able to do his will be amazingly simple compared with our present telephone. A man will be able to carry one in his vest pocket."

Interview with Collier's Magazine, 1926

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The Challenge of Freespace

So why isn't there a solution out there already?

…it's not from lack of trying …

- **Power drop off with distance:**

Horrific regardless of method

- **Huge size or resonating elements:**

Matching size required to be within evanescent range (wavelength divided by two pi) makes a transmitter and receiver large and impractical.

- **Line of sight obstructions:**

Objects between the transmitter and receiver can cause the power transfer to diminish or be lost altogether.

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Present Approaches

Inductive Coupling / Hard Wiring **1840's – present**	De facto Standard Out dated, Too many LIMITS *We are all ready for some new technology*
Freespace **1900 – 2015**	Leaping through air with RF, sound, and resonating coil *Impractical; Cannot overcome power losses in air*
Magnetic Pathways **2015- Next Millenium**	**A NEW approach by Pabellon**: Fast and Reliable Power Transfer across any surface

A trail of tears, shattered hopes and really ticked off investors. This made "wireless" the toxic word it is today.

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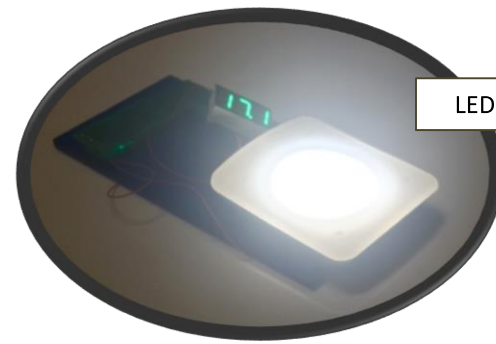
Our Approach to Power

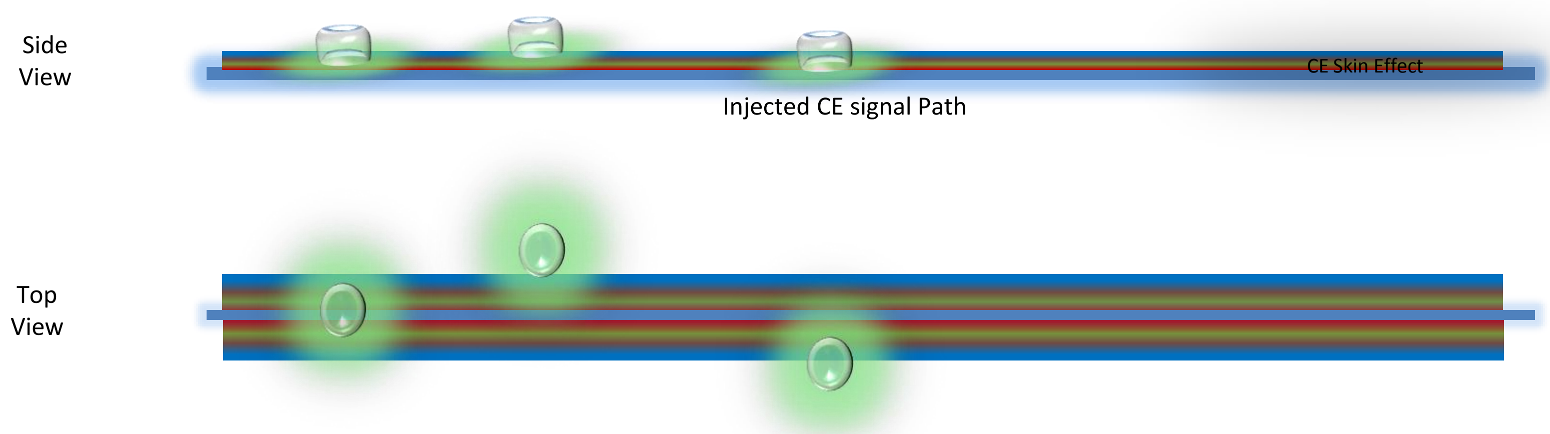
Devices (e.g. Sensors* and Effectors**) with Receiver (Rx) element are trickle charged and/or real-time powered.

- Placed in and around the pathway can power a variety of devices.

Powering of devices is accomplished via an **oscillating magnetic field** that defines the pathway.

- Pathways are engineered for maximum transfer efficiency or can use existing native materials (e.g. pipes, railings, etc.) for transfer power.





**Sensors examples are trace contaminants, acoustic, chemical hazards etc.*

*** Effector examples small motors, lights, etc.*

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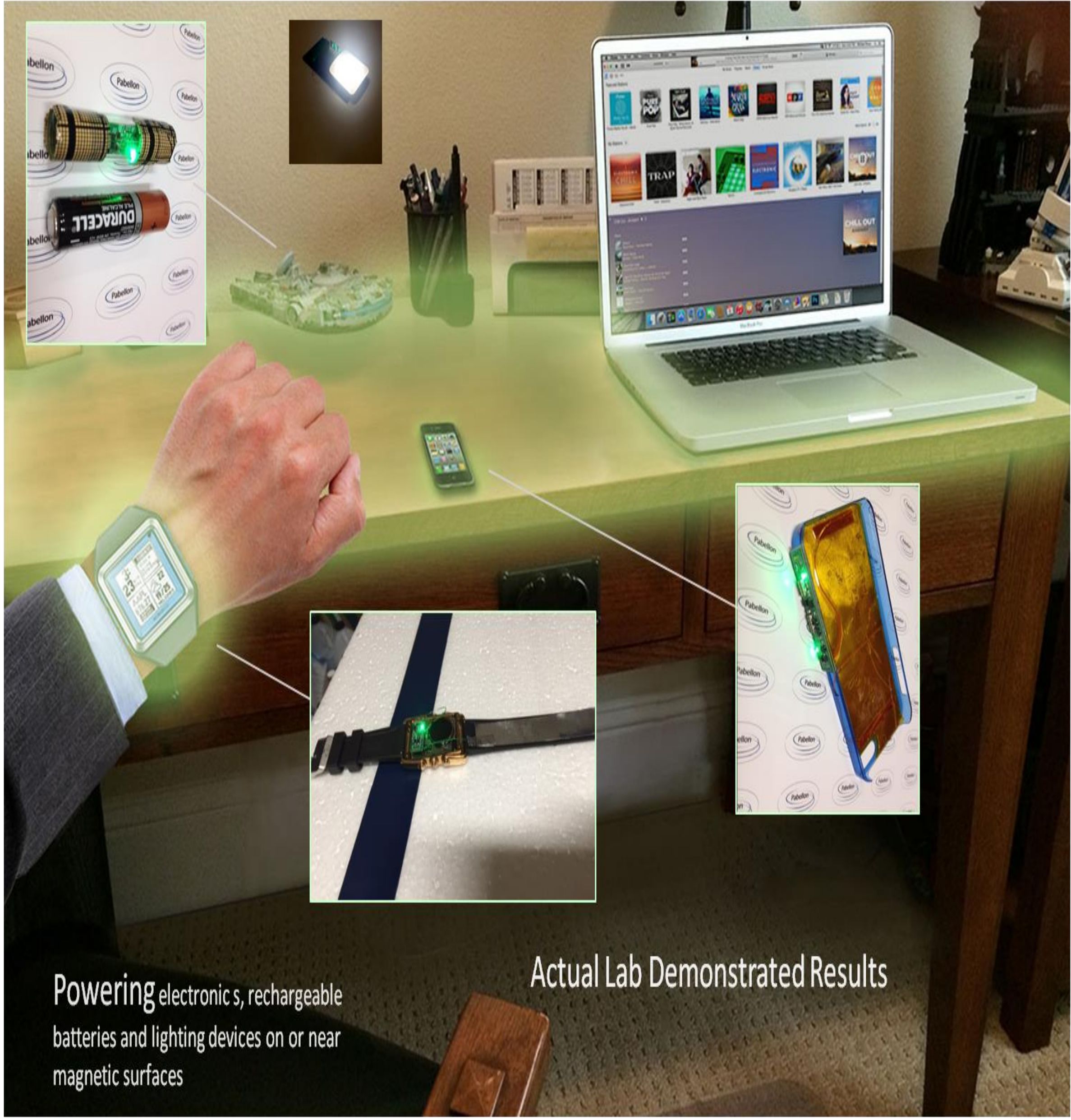
Power Transfer

Power Signals follow the surface of things

Walls, Floors, Clothing…

with minor materials modifications



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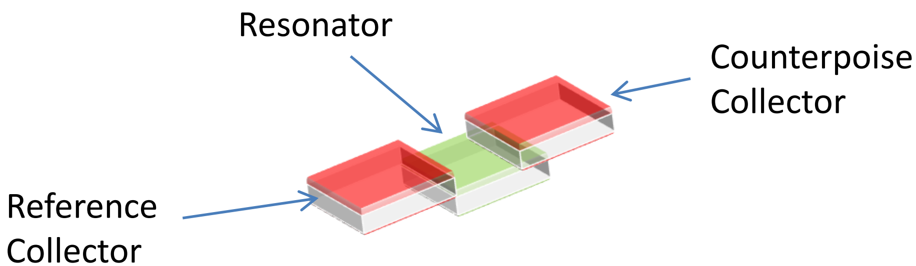
Elements of the System

Name	Component	Function
Transmitter	Power Source Oscillator Tuner Modulator (data transfer only	**Signal** that creates the magnetic pathway
Emitter	Material Path (native or engineered)	**Provides magnetic path** between transmitter(s) and receiver(s)
Receiver	Resonator Collectors Harvest Electronics De-modulation (data transfer only)	The **recipient of power and data** sent from transmitter(s)

Power Harvester Operation

In the presence of a magnetic field, the resonator and collectors give rise to voltage differentials.

The harvest electronics taps specific points where the voltage differentials occur to power a device.



Receiver
(shown without harvest electronics)

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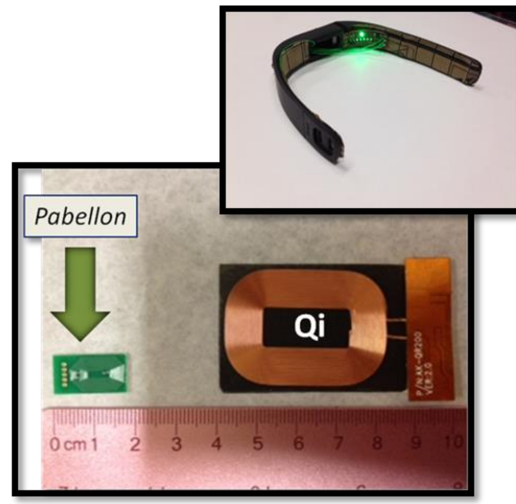
Overcoming Receiver Size

2013



2015

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Early Emitter Experiments

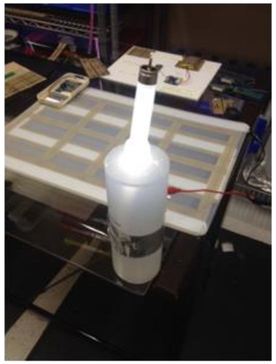
Power transfer over a latex paint conductive and carbon ESD spray conductive plane

Power hop across structures and saltwater filled chambers.

Power hop across metalized tape and saltwater filled PVC. Collective 10 meter separation

2013-2014

Direct Excitation of Plasma at low voltage via labyrinth emitter



Direct Excitation of Plasma via Salt Water Conductive Plane

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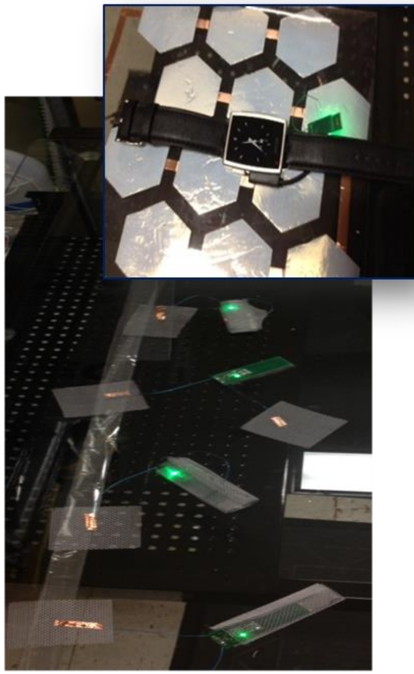
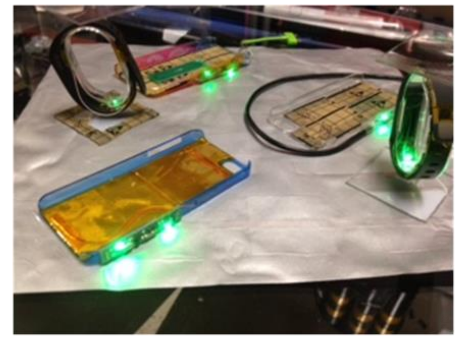
Design Convergence



2014

Transmitter Coils Eliminated altogether



2015

Receiver Products to Suit many Configurations

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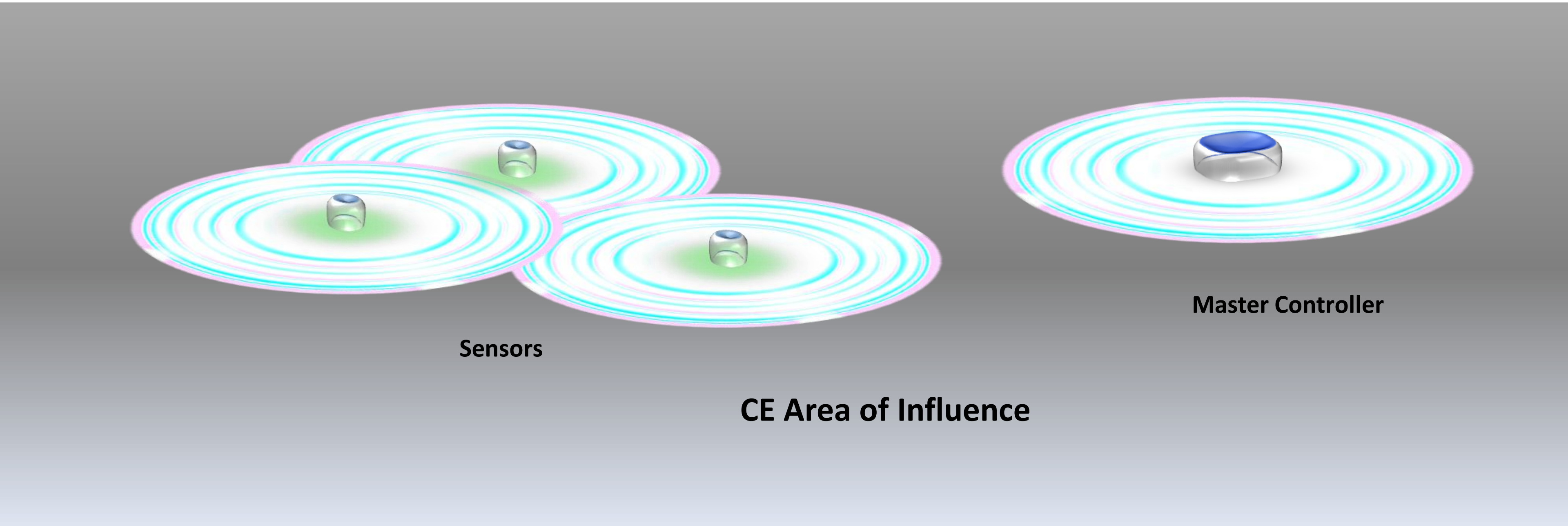
Our Approach to Data

Using Conducted Emission (CE) and sensors enabled with transceivers (TRx), most structures and objects can be turned into a databus.

Typical range from bus controller to distributed sensors is 100 meters to 1 Km at a few watts of broadcast power.



Early Opportunities-Data Transfer

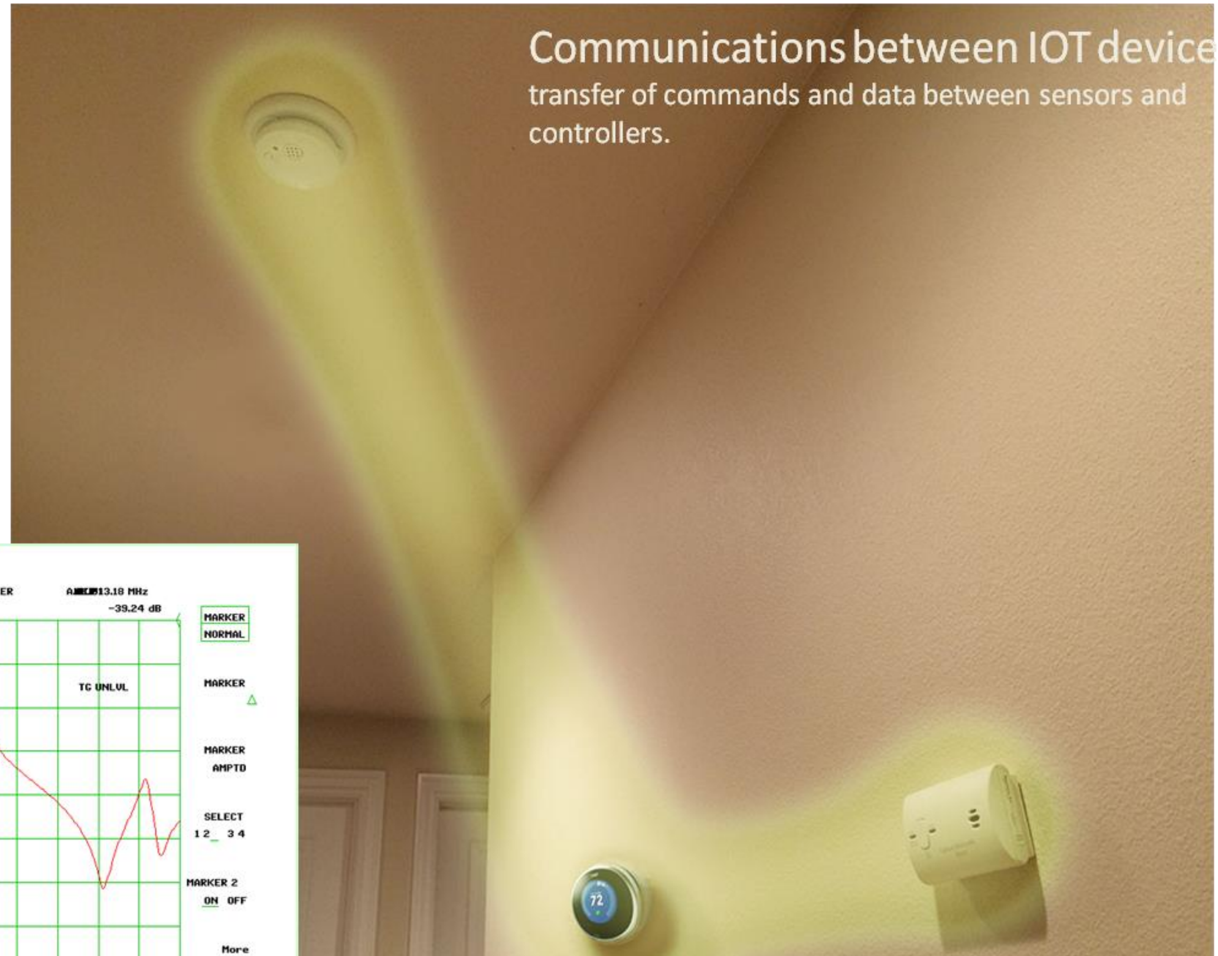
Lab Demonstrated Results

Signals sent between transmitters and receivers up to 100 meters

No modification required to existing structures

Not affected by line of sight between devices.

Data rates in excess of 10 kbs.



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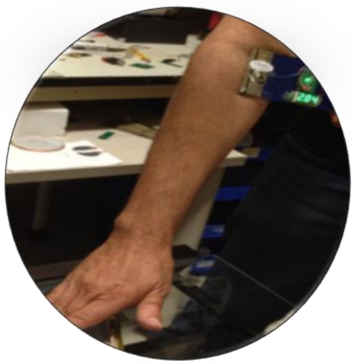
Smart Apparel

Clothing mounted sensor



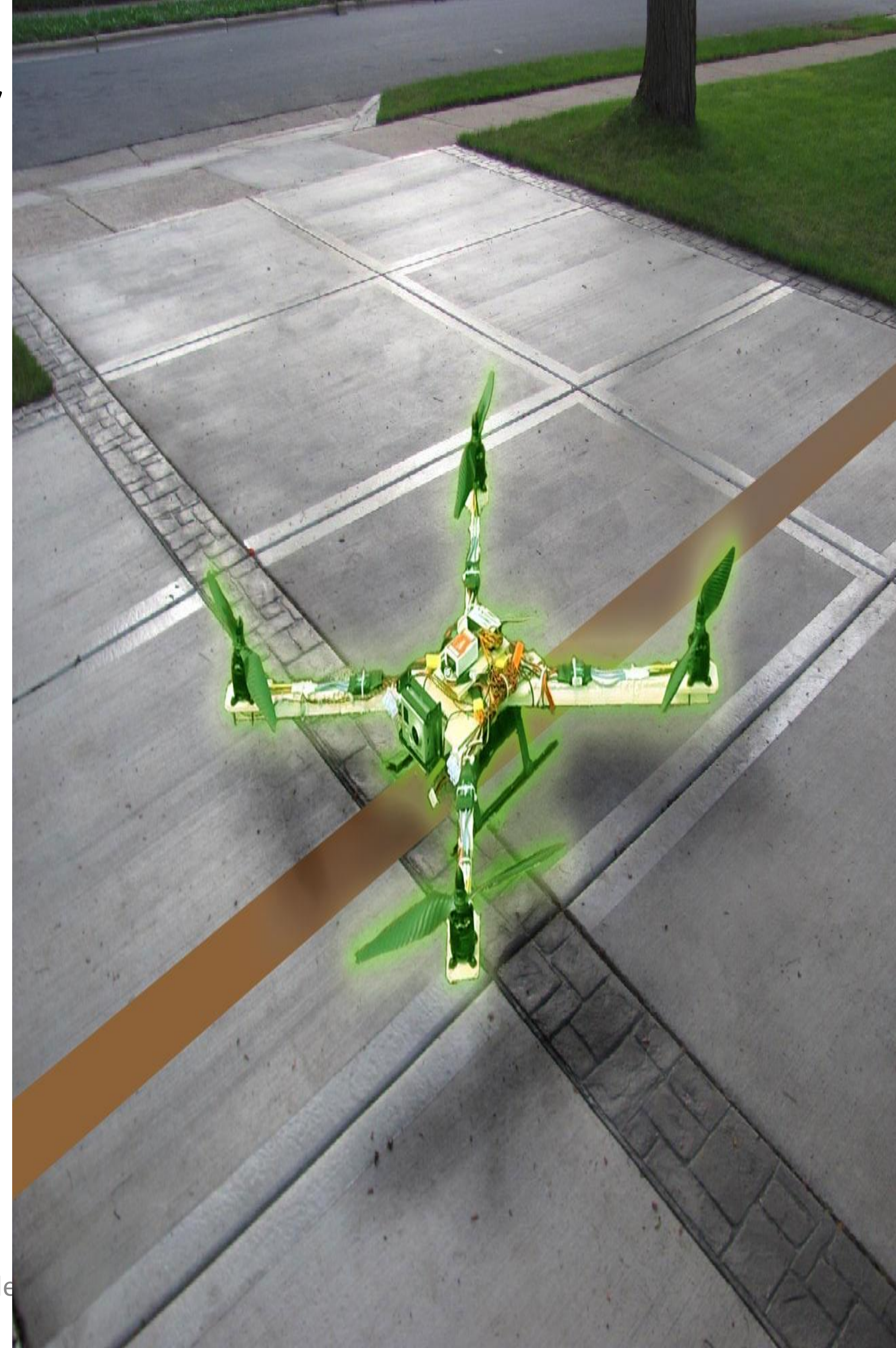
Power and data modulate

Connectorless, wireless power and data connectivity

Recreational Technology

Almost ANY surface can be turned into a charge pad

- Precision landing not needed
- Powered in real time or trickle charged



Demo

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Let's talk about how we can work together

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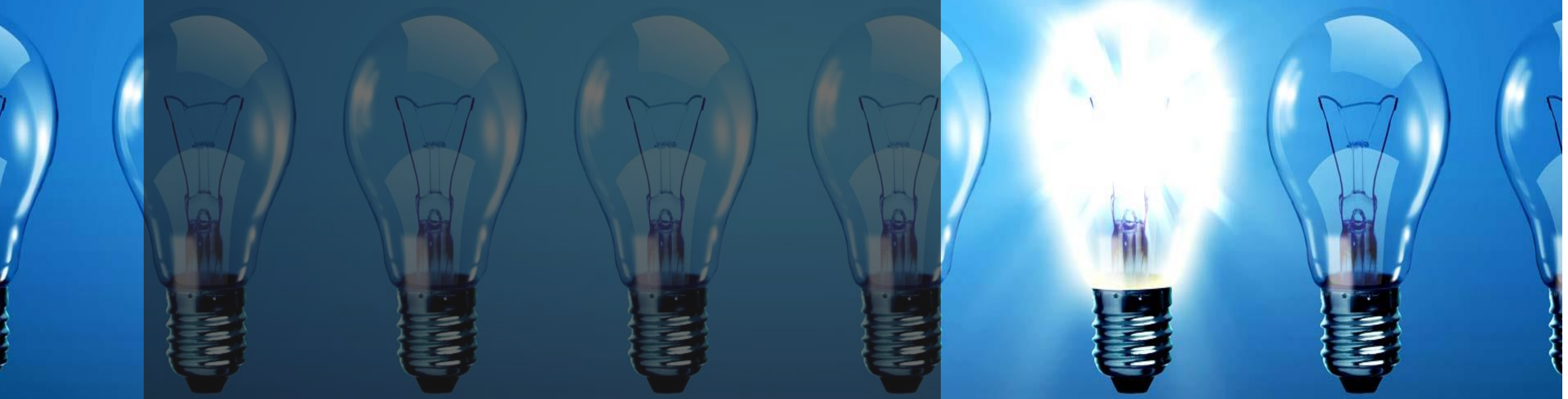

alex@pabellonpower.com

BackUp

A World of Possibilities

Motor driven applications research

“Teslita”

Early opportunities for robotics and electrical vehicle use cases.

Universal built-in battery charger

Any device can have it’s internal battery charged in the vicinity of the emitter pad

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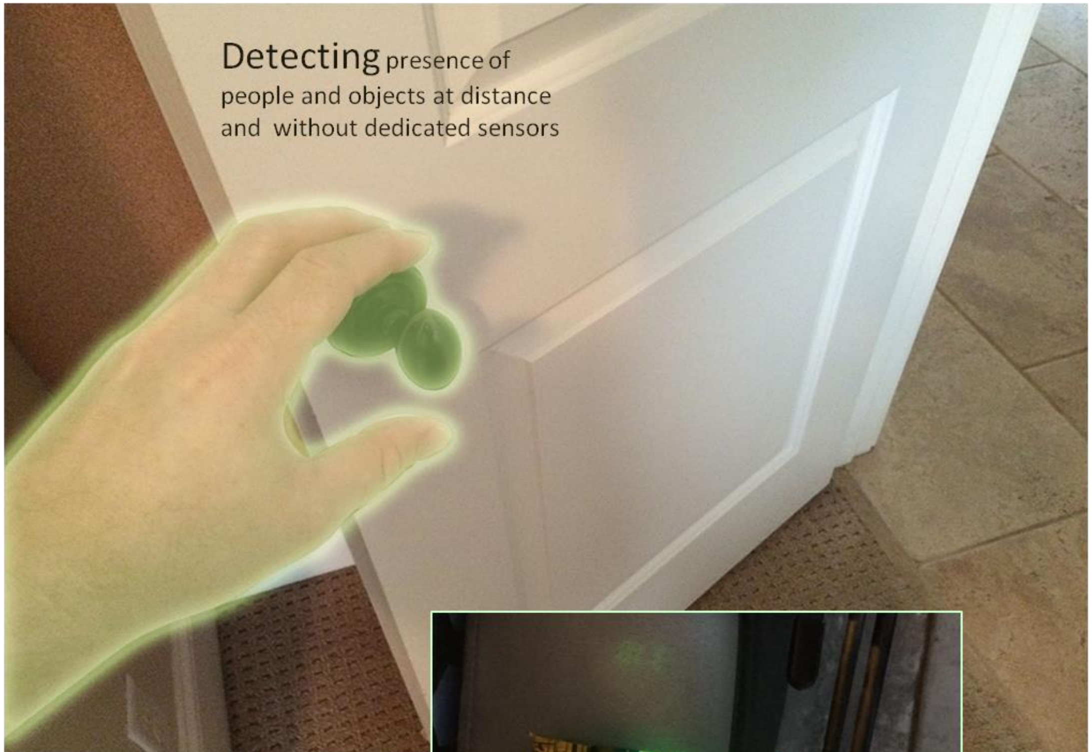
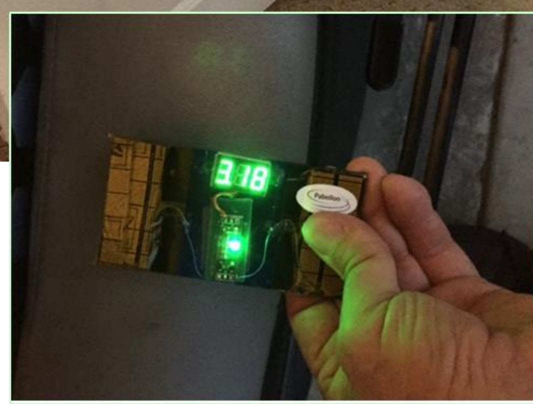
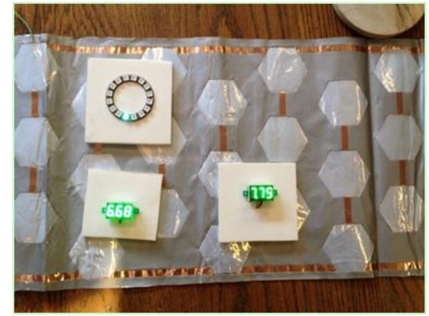
Early Opportunities- Detection







Lab Demonstrated Results

Extremely perceptive detection of presence and intrusion by people and objects introduced to a region.

Unaffected by presence of objects (e.g. walls and floors that separate target of interest and receiver.

Cannot be spoofed or thwarted.

Low power and nonradiative technology that covers large areas up to 100 meters.

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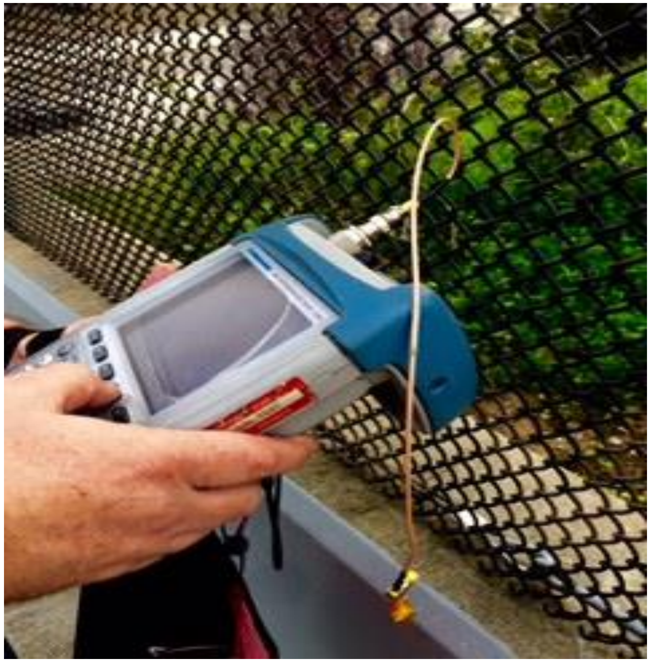
Test Summary

In the test we injected an RF signal from a source into a structure and measured RF signal levels along that structure. Measured levels are used to estimate power levels needed for data transmission from the source to a device connected to the structure.

From our measurements we believe data transmission from the low power source to devices connected to the structure should be viable at distances up to **300 feet** and probably farther. **Distance increases with increased source power**.

Viable trickle charging of devices along a similar structure will require higher power levels than that provided by the low power source, and better impedance matching between the source, the structure, and the devices attached to the structure.

We believe a source of about 10 Watts should be able to provide trickle charging over 100 feet of structure.



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Radiative vs Conductive

Emissions Class	Traversed Media	Transfer	Emissions Observability Region(s)	Emissions Use Region(s)	Signal Attenuation Influences	Carrier Frequency Modulation/Keying Methods (Data Transfer Capacity)	Power Drop off with Distance (d)	Steering
Radiative	Free Space	Data	Nearfield, Transition, Farfield	Farfield	Line of sight obstructions (LOS)	Applicable techniques	1/d^2 w/o LOS attentuation (volumetric)	Beam forming
Conductive	**Engineered Material (emitter)**	**Power, Data, Sensing**	**CE spill "skin effect" into transition and farfield**	**Nearfield, Transition, Farfield**	**Emitter path characteristics**	**Same as Radiative**	**1/d radially from injection point (planar)**	**Emitter path geometry. Transceiver coupling**
Conductive	Native Material	Data	Nearfield with CE spill "skin effect" into transition and farfield	Nearfield, Transition	Native Material path characteristics	Same as Radiative	Approaches freespace characteristics if permeability and permittivity unfavorable	Native Material path characteristics. Transceiver coupling

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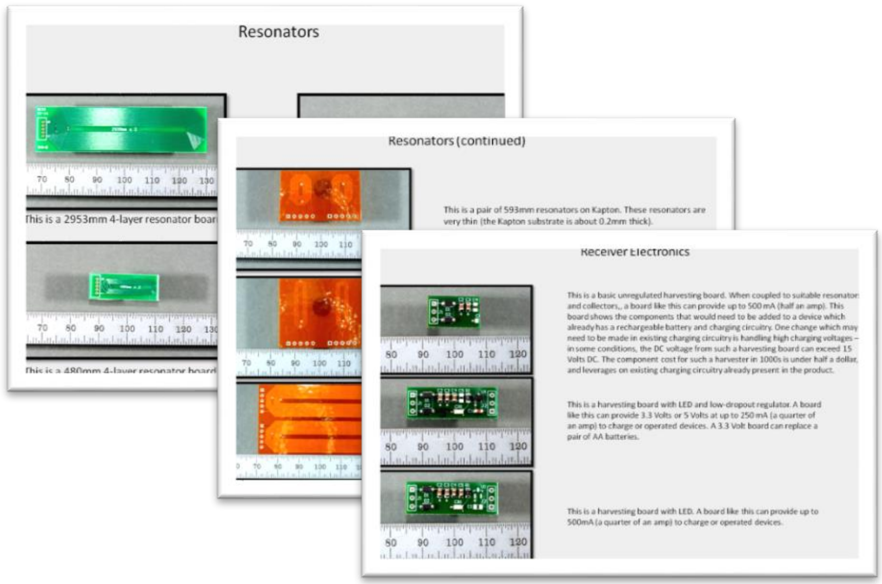
How is an **Emitter** different from an **Antenna**?

	Near Field	Far Field
Radiated		ANTENNA designed to optimized radiated emission
Conducted	EMITTER designed for conducted emissions	

A Family of Prototypes



Engineering Units Available for many Applications

2014

Transmitter Coils Eliminated altogether

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