

Commuter Tracking Sensor Network (CTSN)

- What is CTSN? From where did the idea originate? Why is wireless sensor node technology so important?
 - http://en.wikipedia.org/wiki/Sensor_node
 - A link to a short summary of the project:
 - <http://people.rit.edu/~ags7798/140/project1/interests.html>
 - The information sources that will be used to develop the content of our site are mostly original, but related content can be found at the following sources:
 - Sustainability - <http://www.humdingerwind.com/>
 - Computer Vision - <http://www.gnebehay.com/cmt/>
 - Computer Vision - <http://www.gnebehay.com/tld/>
 - Energy Harvesting - http://www.electronicproducts.com/Power_Products/Batteries_and_Fuel_Cells/Energy_harvesting_from_an_ambient_electric_field.aspx
 - Zigbee Radio Module - http://en.wikipedia.org/wiki/Comparison_of_802.15.4_radio_modules#Integrated_MCU_and_transceiver_modules
 - Solar Charger - <https://learn.adafruit.com/usb-dc-and-solar-lipoly-charger/design-notes>
 - Educational Windbelt Article - http://www.appropedia.org/RCEA_Energy_in_a_Cinch
- Who is the audience for your site? What audience would find the greatest value in your site's content?

An engineer or customer attempting to reconstruct, design, or purchase a similar system involving all or some of the following distinguishing elements of the associated wireless nodes:

 - A sustainable energy source.
 - A custom power module with integrated battery management, power conversion and routing systems.
 - An RF application used to synchronize data across a mesh network, and ultimately to a centralized server.
 - A web application and associated database that will be used to view the gathered information, maintain the wireless nodes, and store logs of the data and node status.
 - A CMU Cam application that captures raw image data, performs computer vision algorithms on that data, extrapolates metadata of that object, and destroys the raw information.
- What is your site's competition?
 - Find at least three existing websites that have a similar topic.

- Wireless sensor technology is becoming increasingly important as the popularity of "Big Data" continues to trend upward.
- [Wikipedia](#) provides a comprehensive list of companies that provide Sensor Node technology for varying applications. Three of the nodes that stand out due to observed quality in design and implementation as well as professional presentation are:
 - Atmel – [Raven Wireless Kit](#)
 - <http://www.atmel.com/tools/avrraven.aspx>
 - As shown at the source above, Atmel offers an evaluation kit to get started with development using their AVR picoPower processors. Support is excellent. A start here button redirects the user to a webpage where information about purchasing the necessary hardware and software is located, as well as links to their [dedicated user forums](#).
 - Monnit – Sells a variety of end-user products dealing with monitoring of various types of data.
 - <http://www.monnit.com/>
 - The company is highly professional in their presentation and design of product, and offers a variety of monitoring solutions for the end-user at decent price points. They also offer their sensor and gateway technologies, as well as their end-user software to engineers that would like to design their own model. Support is excellent, as the company offers educational videos and how-to tutorials for both end-users and makers.
 - Advanticsys – Sells the CM/XM product line of wireless sensor networks. An example is their [CM5000](#), which is a temperature, humidity and light sensor that utilizes one of TI's microcontrollers along with an 802.15.4 WSN wireless transceiver that was developed at the University of California, Berkley.
 - <http://www.advanticsys.com/?lang=en>
 - The company offers resources for each of its embedded sensors, transceiver, and microcontroller. Prices are fairly reasonable, and they ship around the globe.
- o Compare the concept of your site with these sites. For each of the competitive sites, discuss what it does well/ effectively and what areas need improvement. What deficiencies can your site fill?
 - All of the above sites offer a battery powered sensor node application, but none of them have the ability to connect with a sustainable source of energy to slow the rate of discharge of that battery or the source of energy is a common one (solar).
 - Our product attempts to uniquely apply the Windbelt sustainability element to the sensor node system. It will also utilize power saving technology provided by Texas Instruments to harvest energy, convert and route that energy to both a radio and embedded camera.
 - In terms of website design, the competitors have excellent presentation in their website. We hope to take some of their ideas, such as online documentation, specifications, and written and video tutorials and use them in our website. We also plan on making it more "maker" and hobbyist friendly by posting educational

assignments, where users can attempt to reconstruct the systems used in the CTSN. Solutions will also be available, along with classroom handouts, and a curriculum guide for teachers in an “Education” section of the website.

- The audience for our site will be somewhat different than the professional sites above, since it is more educationally oriented towards a college-level class project. For this reason, we need a section in the website that explains the theory behind the application using engineering terminology. This section will be used by visiting colleagues and/or professors that have a stake in the project, or are interested in borrowing ideas for their own design. This will be in addition to the hobbyist-friendly section that does explain the theory, but not in nearly as much depth.
- Additional information will be in the form of video and written tutorials. These can be used to verify that certain design points have been applied correctly, or just referenced as a guide while duplicating a design.