

Marketing Requirements	Engineering Requirements	Justification
1,5	System will be capable of collecting levels of CO, and dust (particulate matter) in the environment.	Primary air pollutants defined by the EPA are ozone, nitrous oxides, sulfur dioxide, lead, particulate matter, and carbon monoxide. Sensors for detecting ozone, nitrous oxides, and lead are far too expensive (hundreds of dollars) to implement. Sensors for CO and particulate matter are affordable and thus implementable on many bikes.
1,5	System will be capable of collecting temperature, humidity levels, and riders pulse rate.	Temperature and humidity are environmental factors that can affect pollutants and sensors and are therefore useful for data analysis. Riders' pulse rate will also give an idea of the amount of air the riders is breathing and any given time.
2,3	System will be housed in a small enclosure that allows copious amounts of airflow.	In order to effectively measure fluctuations in pollutant levels, the enclosure must allow for significant airflow.
1,5	System will be capable of transmitting the sensor data to the main OBI unit.	In order to save on cost and to utilize the resources already available on the main OBI unit (such as GPS and wireless data transmission), the unit will be capable of transmitting the sensor data to the main box.
4	System will be capable of passing power to the main OBI unit from a dynamo for charging of battery.	The OBI bicycles will have a hub dynamo to generate power. Our box will transmit the generated power to the main box in order to charge the batteries but will not make use of the power.
1,4	System will be powered via 3.3V line from main OBI box.	The main OBI box contains rechargeable batteries which are the only constant power source on the bicycle. It is capable of transmitting power via a 3.3V line. In order to save on cost, we will be utilizing said power.
1,4	System will connect with main OBI unit through an RJ45 connection.	The main OBI box only has an RJ45 jack and wireless data to allow for communication with the outside world. Thus, in order to transmit the data and power to the main box in a cost effective manner without the need for additional power, the systems will be connected via RJ45.
5	System will be capable of time-stamping data.	In order to correlate the data with the GPS coordinates on the main box route

		analysis, the unit must be capable of time-stamping the data.
1,4,5	System must use an inexpensive microcontroller.	A microcontroller capable of communication and data collection from all sensors must be implemented.
5	System will collect sensor data every few seconds.	Since pollutant concentrations can fluctuate very frequently, the system must be capable of collecting data often.

Marketing Requirements

1. The system should cost under \$250 per unit to manufacture.
 2. The system should not interfere with bicycle rider.
 3. The system should be light and portable.
 4. The system should have somewhat low power consumption.
 5. The system should provide useful data.
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