Carbon Dioxide Sensor Array for the ISS
Mitchel Dyrdahl, Stephanie Gibbons, Laura Turf
Dr. Benedito Fonseca Ph.D
Dr. Lance Christensen—Jet Propulsion Laboratory
Electrical Engineering and Mechanical Engineering

Abstract
High levels of carbon dioxide (CO$_2$) aboard the International Space Station (ISS) have been reported to cause cognitive impairments among its crewmembers. Jet Propulsion Laboratories (JPL) proposed a project to create a wireless carbon dioxide sensor array to measure CO$_2$ levels in the environment.

Introduction
Jet Propulsion Laboratories has tasked the team with designing a wireless carbon dioxide sensor array. This array will output real-time data for the crewmembers on the ISS to monitor their environment and adjust the air quality as needed. The impact of this project allows the understanding of CO$_2$ and the effect it can have on a person’s cognitive impairment.

Methods and Materials
The selected design for the CO$_2$ array uses a ZigBee mesh network. Each node is constructed using an Arduino Mega and an XBee S2C transceiver. The programming software used is XCTU and the Arduino Mega is programmed in C language. The collected data is displayed using a graphical user interface (GUI) programmed using Python.

Results
The image below is the Graphic User Interface used to display the results from the sensors.

Discussion
The team was able to successfully design and build a network to transmit and store data collected by the sensors.

Conclusions
This sensor array design for JPL will monitor the carbon dioxide levels in the ISS and distribute the data in real-time. The implementation of this array will allow the air aboard the ISS to be monitored and adjusted as needed.

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