

Overall, the differences between the current and updated designs are not so large. There were neither particular strides in savings, nor were there any great reductions in weight and power draw. The original design is around 10 grams heavier than the updated one, and has 0.02 W less power draw. The updated design similarly costs around \$143 to implement, and as a result the two configurations are very similar in heft, cost, and power draw. The main differences arise from the increased reliance on the I2C protocol to communicate between the sensors and the Arduino. In addition, despite maintaining very similar specs, the updated board uses higher quality components capable of taking measurements at extreme conditions, including the RTD temperature sensor, which is capable of taking measurements at some of the most frigid conditions one is likely to encounter, boasting remarkable performance and accuracy at -200 degrees Celsius. In addition, the humidity sensor has a sensitivity at all relative humidities, with an unimpeachable accuracy of 2%. The pressure sensor is likewise extraordinarily capable. The diminished reliance on the analog pins of the arduino is better suited for the high energy environment present in the stratosphere, owing to the fact that the analog pins are highly sensitive to subtle electric interferences which become more prevalent at higher altitudes. Consequently, the need for advanced error detection and correction is mitigated. This reduces the overhead for the programmer, which would most likely need to implement an advanced error correction code in order to afford any semblance of reliability and accuracy in the sensors. Not to mention the fact that overloading the arduino analog pins may be problematic without implementing a delay, an inconvenience most readily mitigated by instead using I2C and SPI. Ideally, SPI would be the best alternative; however, too many pins are needed. The I2C protocol, owing to its shared bus architecture, allows a significant number of sensors to be connected to the same pins, as long as they have unique addresses, which is practically guaranteed in this project. Although there were some extravagances afforded in this project, the fact that it was possible to indulge them whilst maintaining similar weight, cost, and power draw, not to mention the fact that all components are readily available, renders the updated design superior.