Requirements for Integrated Accelerometer Probe with Data Display

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This document lists out the requirements for both the encapsulated accelerometer ball (also known as just "Ball") and the data display PCB (also know just as "Display").

General Requirements

Accelerometer Ball

1. The Ball shall include an accelerometer with at least 2 dimensions of sensing.
2. The Ball shall use either RFID or NFC wireless communication protocol with compliance with ISO Standards
3. The Ball shall log accelerometer data during flight with a sampling rate of at least 10Hz and a max recording time of 5 seconds.
4. The Ball shall have enough on-board power to log and transmit ID information and accelerometer data for at least 5 seconds
5. The Ball shall be encapsulated in a material that prevents damage to the point of inoperability
6. The Accelerometer shall communicate with the NFC chip using SPI, I2C or another established digital communication protocol

Data Display

1. The antenna shall be capable of receiving data from at least 10 cm away from the ball
2. The antenna shall be capable of reading data from at least 90% of encounters with the ball
3. The display shall use an ATSAMD21G18 microcontroller to process and display data.
4. The display shall use an LCD display capable of at least 4 lines of data and provide a continuous read out of the data received from the ball.
5. The data display shall be powered internally with a rechargeable power source.

External Communications

USB

1. The Ball shall be capable of usb interface via JTAG through pin connections but does not require a specially designed port.
2. The Display shall be capable of programming through USB and interface with a citcuitPython development environment.

Regulatory

1. The NFC transmitter will comply with ISO standards 14443 and 18092.