

FireWorks Smart Helmet

An affordable and innovative helmet to help wildland firefighters prevent heat-related illnesses on the fireline.

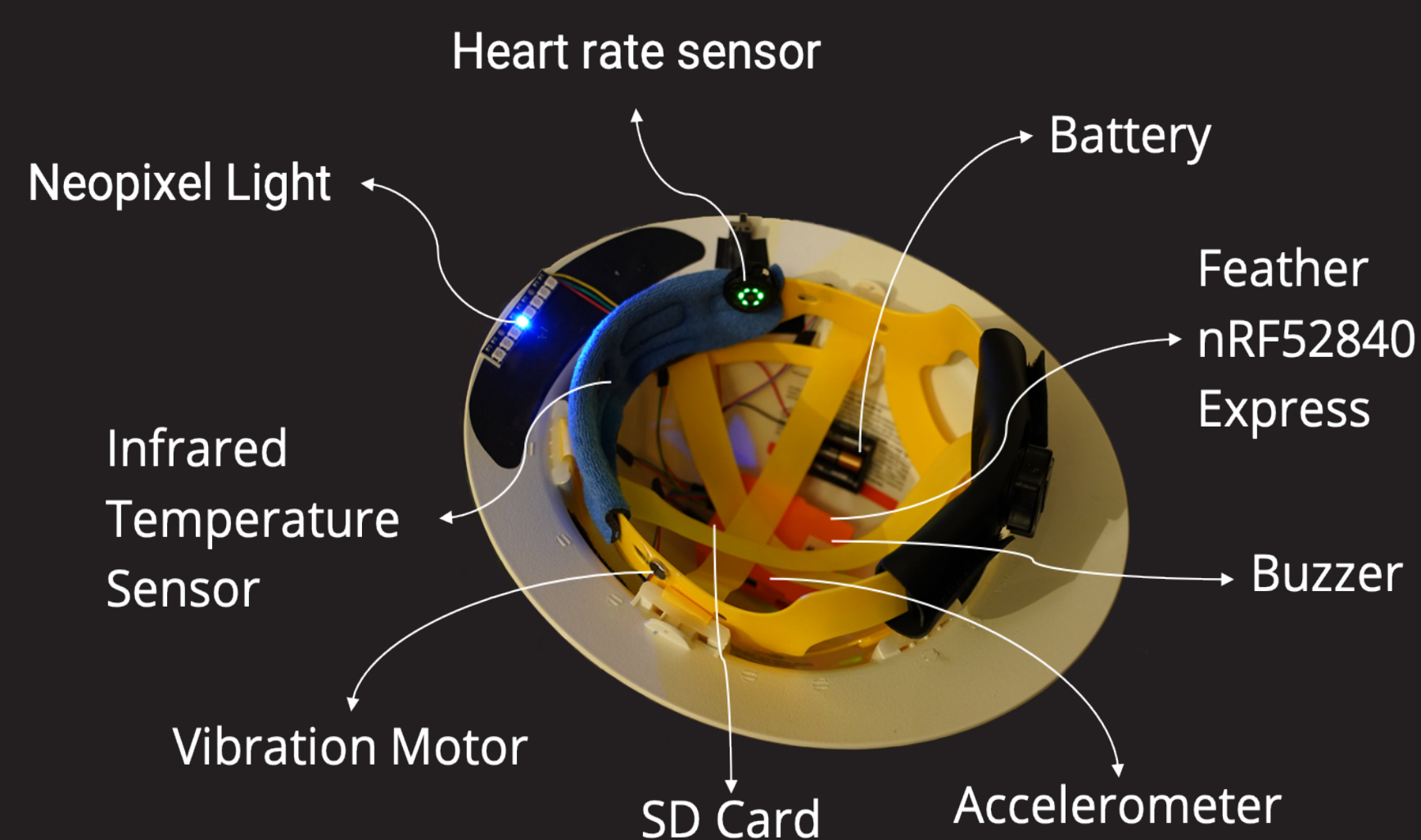
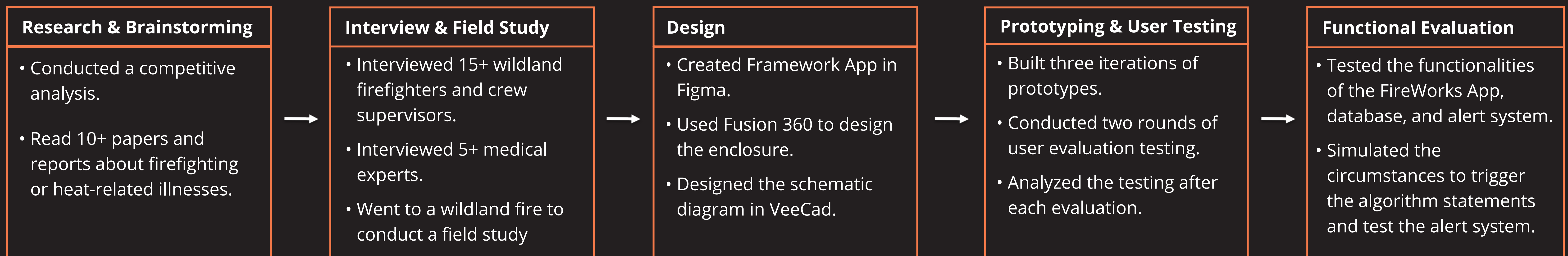
Problem

Heat-related illness is a severe problem that wildland firefighters face during their deployment. Since 2000, 313 wildland firefighters have lost their lives on the field, and 54% of them were caused by overexertion under hot and challenging conditions. The current method used to distinguish different heat-related illnesses, such as heat cramps, heat exhaustion and heatstroke is by human observation. However, human observation can be too slow and inaccurate in assessing different heat related conditions. Our team project focused on how emerging technologies might monitor wildland firefighters' physical condition, so that potentially hazardous situations can be anticipated.

Solution

Our proposed solution involves using heart rate, temperature, and movement data to alert firefighters and their supervisors about potentially hazardous heat-related illnesses. We have developed a smart helmet with integrated sensors to monitor the health data, a corresponding FireWorks App to show data visualization to the wildland firefighters and supervisors, and an alert system on the helmet to nudge the firefighters and supervisors when it detects abnormal data. All sensor data are also sent to the App using Bluetooth and it would be synced to the cloud database so that supervisors can be alerted and monitor their crew's health conditions.

Process

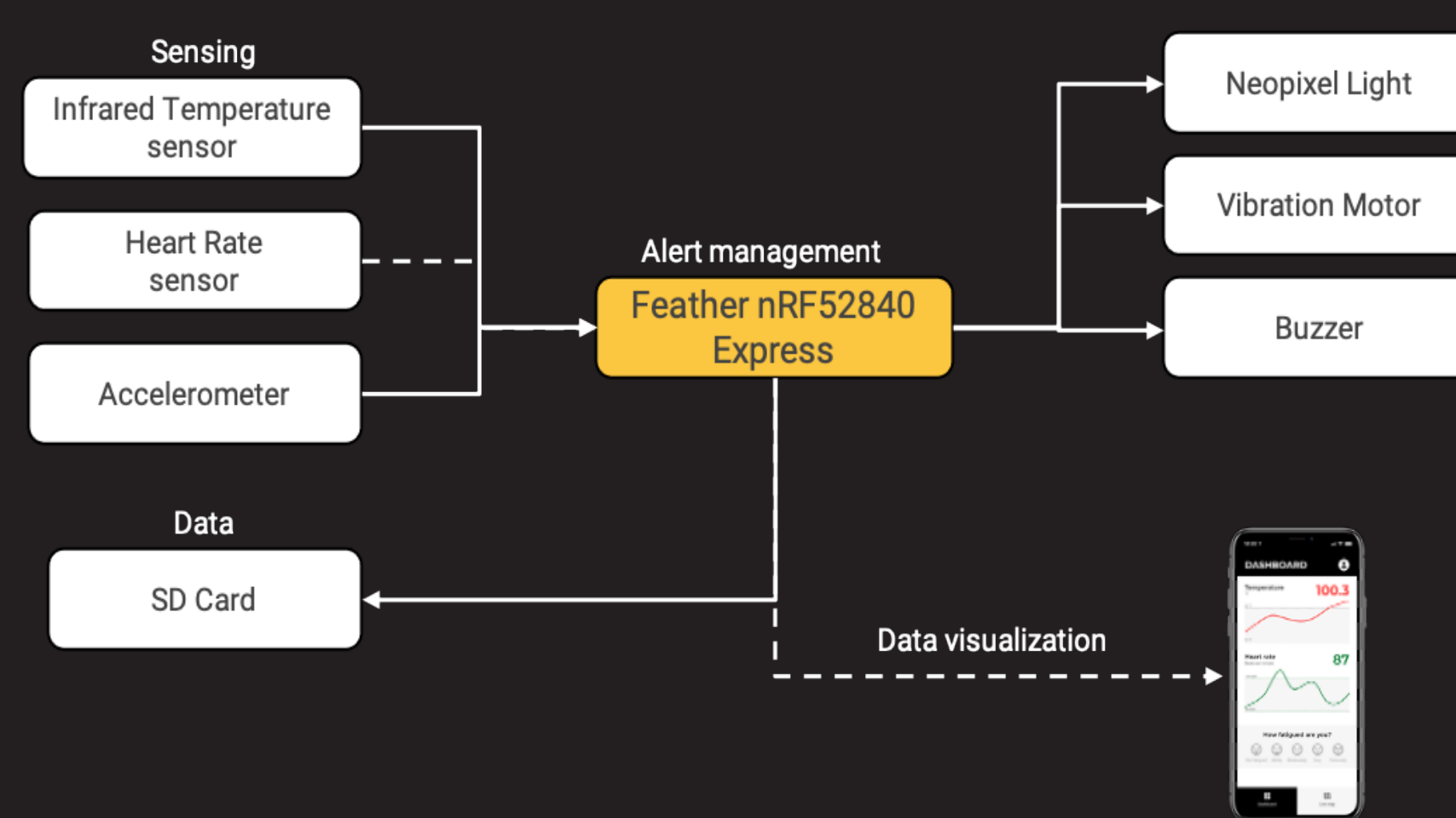


Smart Helmet Physical Prototype

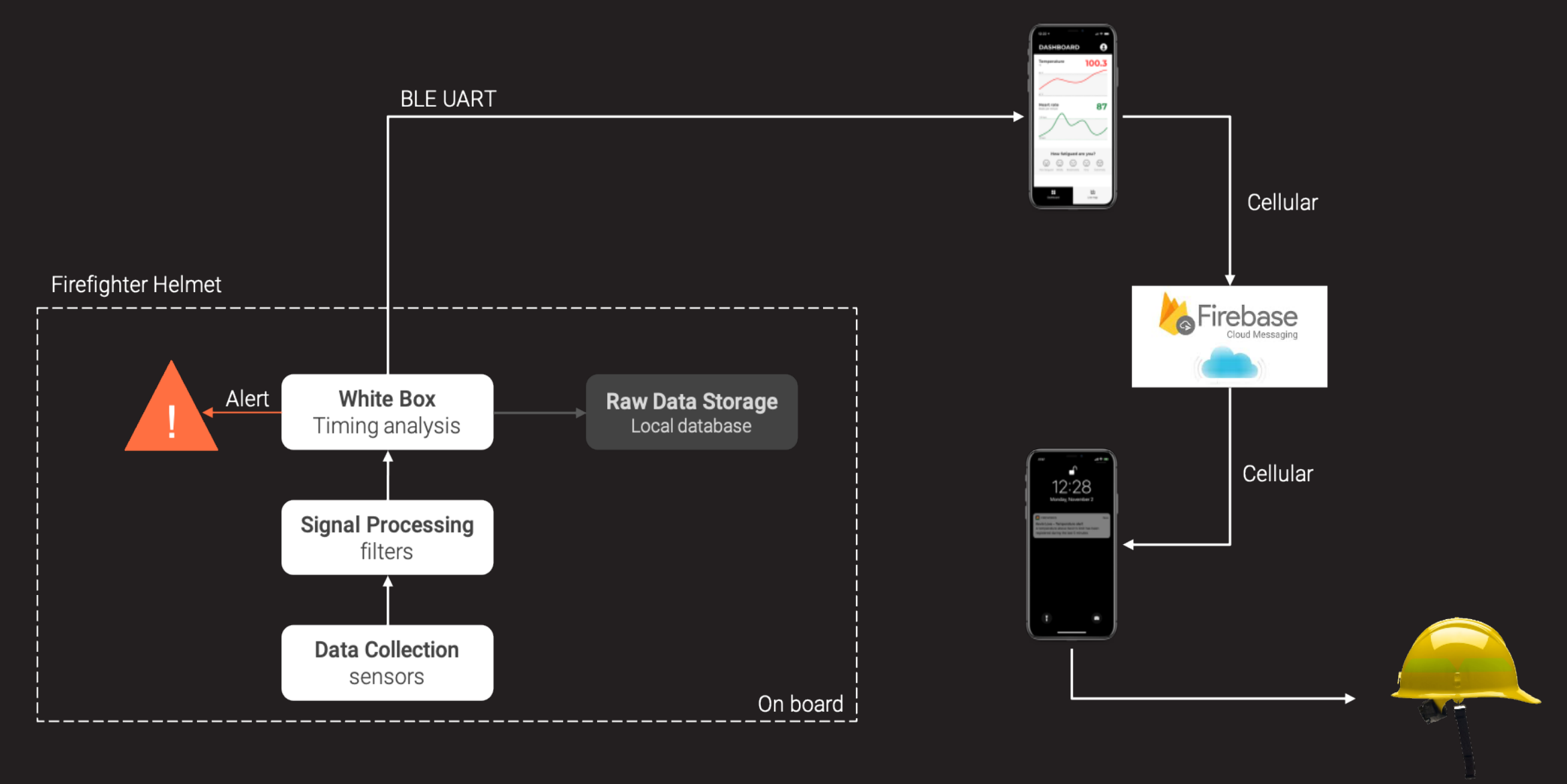


FireWorks App - Firefighter Side

FireWorks App - Supervisor Side



Hardware Architecture



Software Architecture