Drone-Delivered Naloxone in Richmond

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The objective of this project was to construct a system to field test the concept of delivering life saving medical devices, mainly the opioid overdose reversal medication Narcan® (naloxone HCl), to a bystander in the City of Richmond. Richmond is 62 square miles with a mean radius of 4 miles. After a 911 call is made in Richmond, an ambulance dispatched from Richmond Ambulance Authority (RAA) will take on average 6 minutes to arrive on scene. Our Unmanned Aircraft System (UAS) could arrive on scene anywhere in the city in under 2 minutes. Those minutes are crucial to survival since for every 1 minute after the heart stops life expectancy is reduced by 10%.

The project's outcome is a secure UI (User Interface) that can remotely dispatch a UAS to autonomously fly to a destination along a multidimensional route determined by a path finding algorithm or the dispatcher. The UAS can be rerouted, paused, and told to return home while inflight. Detect-And-Avoid (DAA) capability enabled by ultrasonic and visual sensors, and manual UAS control through the UI were completed. Using the DAA system, the dispatcher can authorize an automated landing. Adding a bidirectional audio/video system allows the dispatcher to help with the process of the medical procedure on site. A tiltable camera system was upgraded with infrared capabilities focused on visibility at different angles and times of day. Support for a UAS fleet was implemented with the ability to automatically or manually select the optimal UAS for each flight.

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