

Drone Delivery of Cold Chain Medical Supplies Viability and Efficacy

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Abstract

More than a billion people in the world lack access to all weather roads, leading to major difficulties in health services distribution. Many have proposed the use of Unmanned Aerial Systems (UAS) to improve the last leg of the supply chain. These proposals have addressed the distribution but not the cold chain required by critical supplies like vaccines. The development of lightweight, actively cooled chain technology for drones is crucial to the expansion of the supply chain's final leg. The following explains the development of a system to maintain and monitor the package for temperature, location, and supply integrity. Using simple materials and 3-D printed parts to insulate and actively cool the internal chamber the system meets established minimum volumes for medical supply transport via UAS. A simple SMS based communication protocol and modular attachment mechanism allows the device to be used by anyone with any UAS. Validation of the 2-8 C° target will be verified using WHO prequalified Vaccine Vial Monitors (VVM's) proving the viability and efficacy of the use of UAS in cold chain supply distribution.