



Introduction

Wildfires are a major natural threat to the United States because of their wide coverage, frequent occurrences, and significant revenue loss that they cause. The following figure shows the locations of wildfires greater than 250 acres from 1980 to 2003. On average, the United States has 97,000 wildfire starts with a total of 4.9 million acres per year, and federal agencies spend more than \$1.6 billion every year to suppress wildfires. Wildfires produce short- and long-term effects on the ecosystems; place communities at risk especially those in the wild-land urban interface throughout the United States; and also cause the death of firefighters.



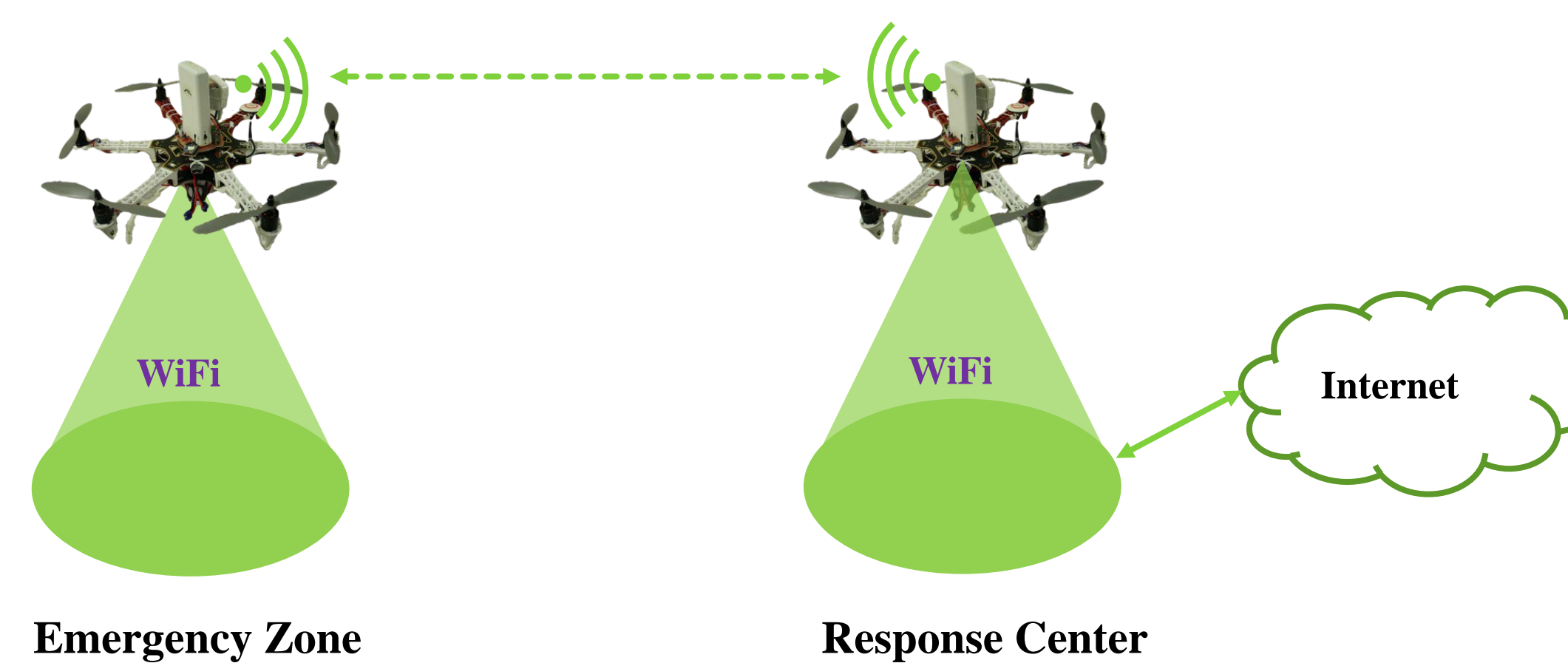
Currently in severe wildfire scenarios, a helicopter is dispatched to take a video of fire conditions and flies back to the command and control center for resource planning. This process is costly, of limited availability, and highly inefficient because of the delay in relaying crucial information.

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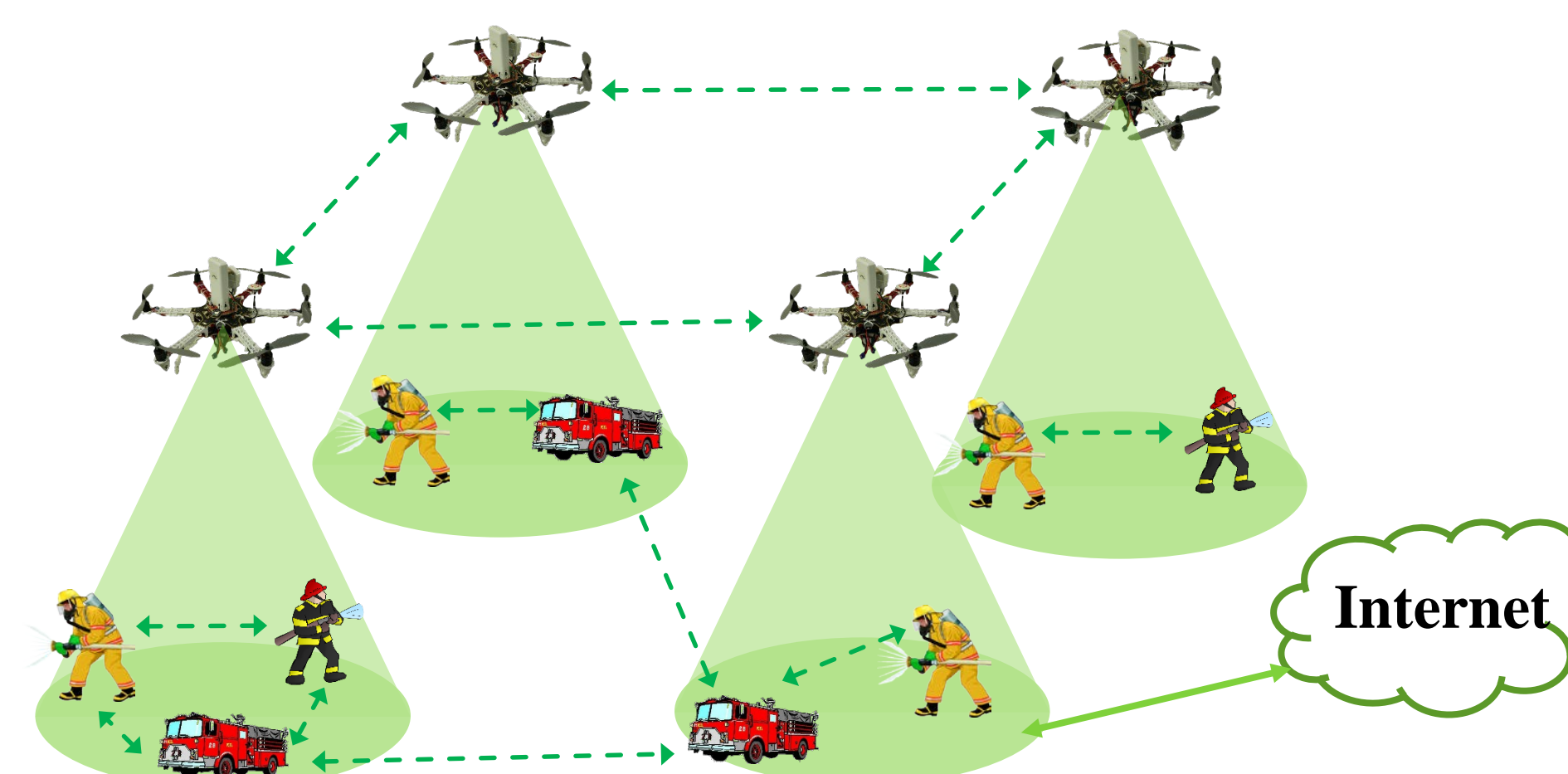


System Design

The objective of this proposal is to develop an advanced wireless technology on the drone-carried ad hoc Wi-Fi networking system and pursue its application in emergency preparedness, a national priority. The WiFi network can be connected to the Internet to extend WiFi access to areas where WiFi and other Internet infrastructures are not available.



As shown in the above system for emergency scenario, the drone-carried WiFi system will provide fast-developed high flexible communication infrastructure to enable activities such as real-time video transmission, rescue team coordination, and phone/email communications.



Experiment Results

Our experiments are conducted on 150m, 300m and 1Km. In the experiments, the two drones are maintained at the height of 10m manually. Each end connects a laptop on the ground by WiFi. The bandwidth test will be originated from CLIENT side towards SERVER side.

L_{dd}	Drones	Median(Mbps)	Average(Mbps)	STD(Mbps)
150m	Static	42.4	44.2	6.0
	Hover	40.1	36.2	11.9
300m	Static	36.1	35.9	5.7
	Hover	19.9	18.4	9.2
1000m	Static	12.4	13.4	7.0
	Hover	8.2	7.8	6.3

Collaborators

- Denton County
- Austin Fire Department
- North Central Texas Council of Governments

