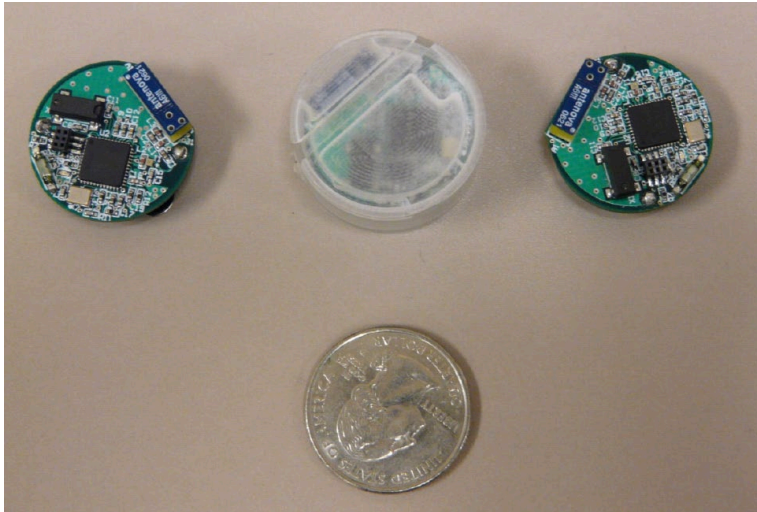


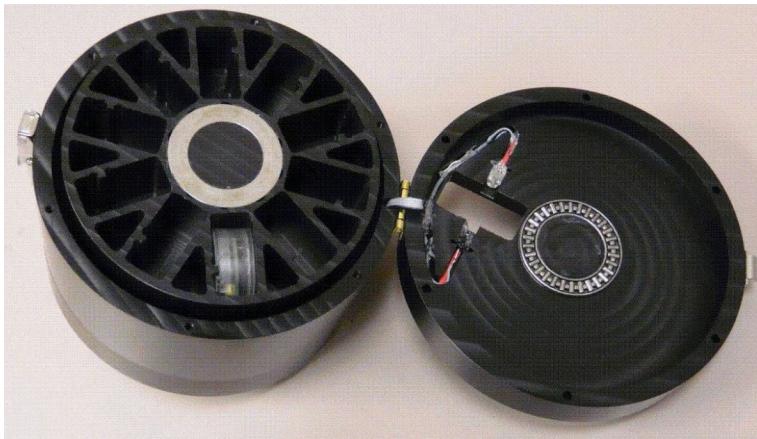
# SureFire Communication Networks Work Package

Qixin Wang

# Breadcrumb networks: state-of-the-art wireless sensor network solution



(a) Breadcrumb wireless sensors



(b) Smart dispenser

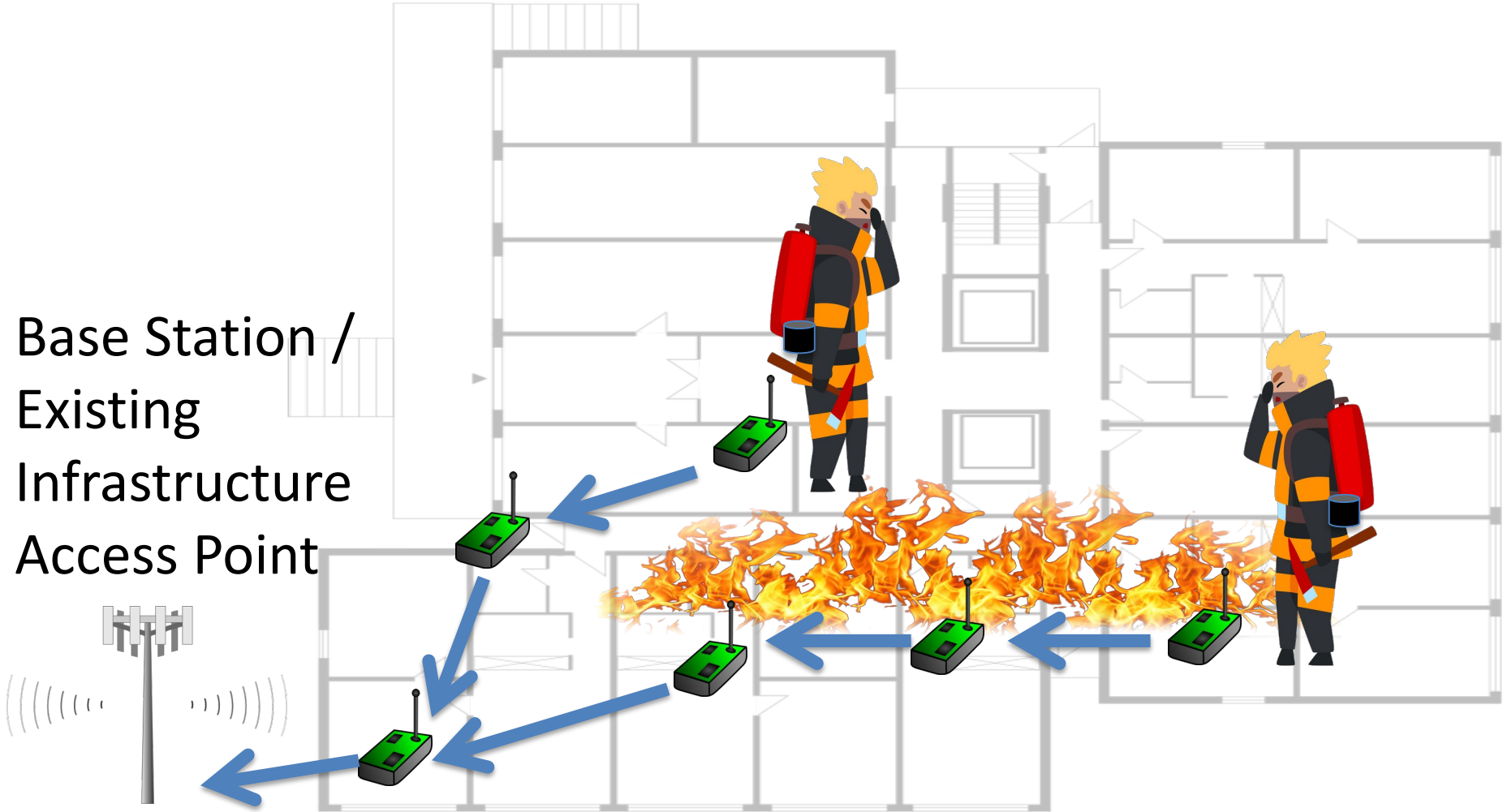


(c) A firefighter equipped with a smart dispenser, and two breadcrumbs dropped on floor.

(a)(b)(c) are quoted from (Liu et al, 2010).

# Breadcrumb networks: state-of-the-art wireless sensor network solution

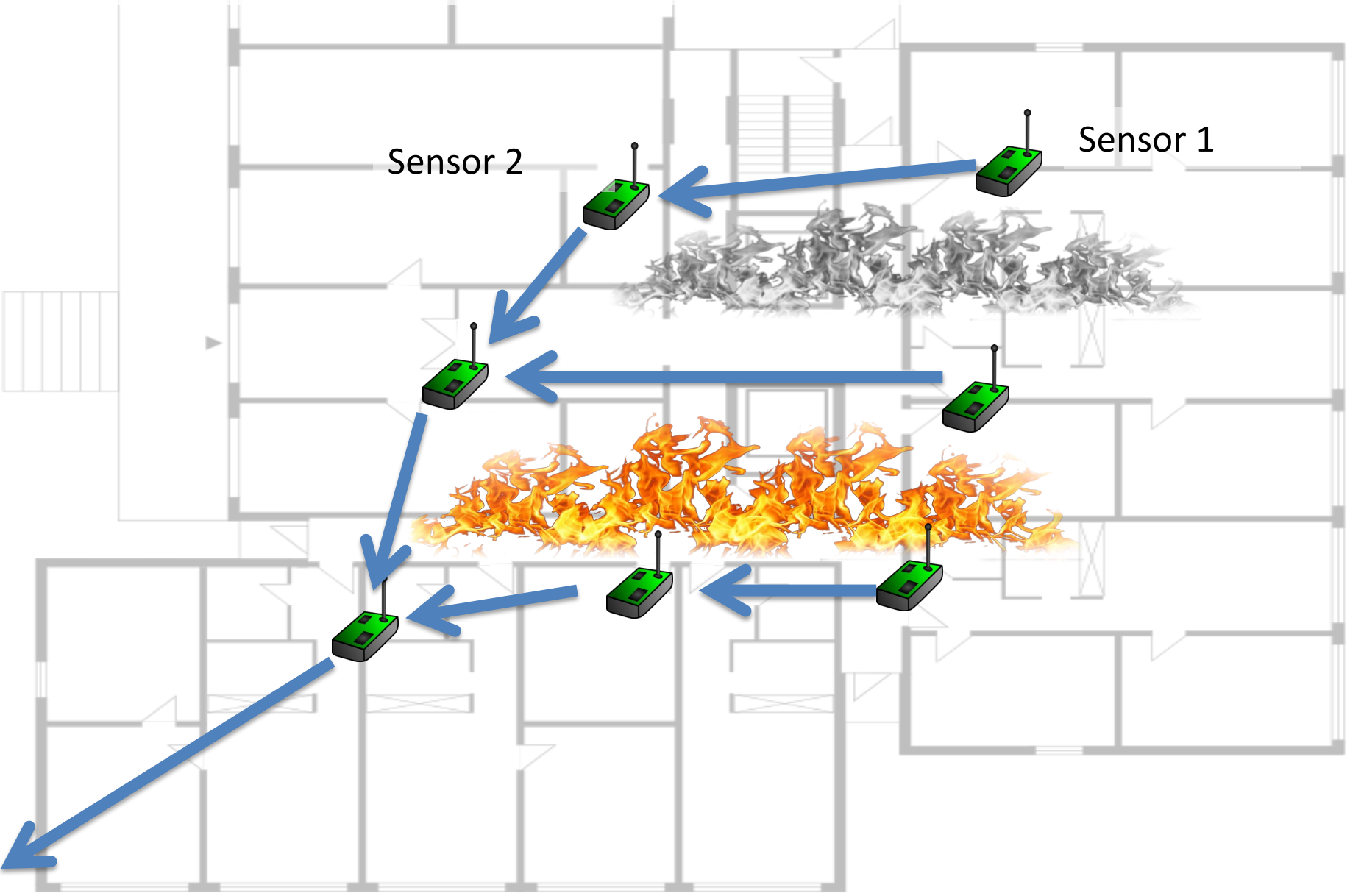
Base Station /  
Existing  
Infrastructure  
Access Point



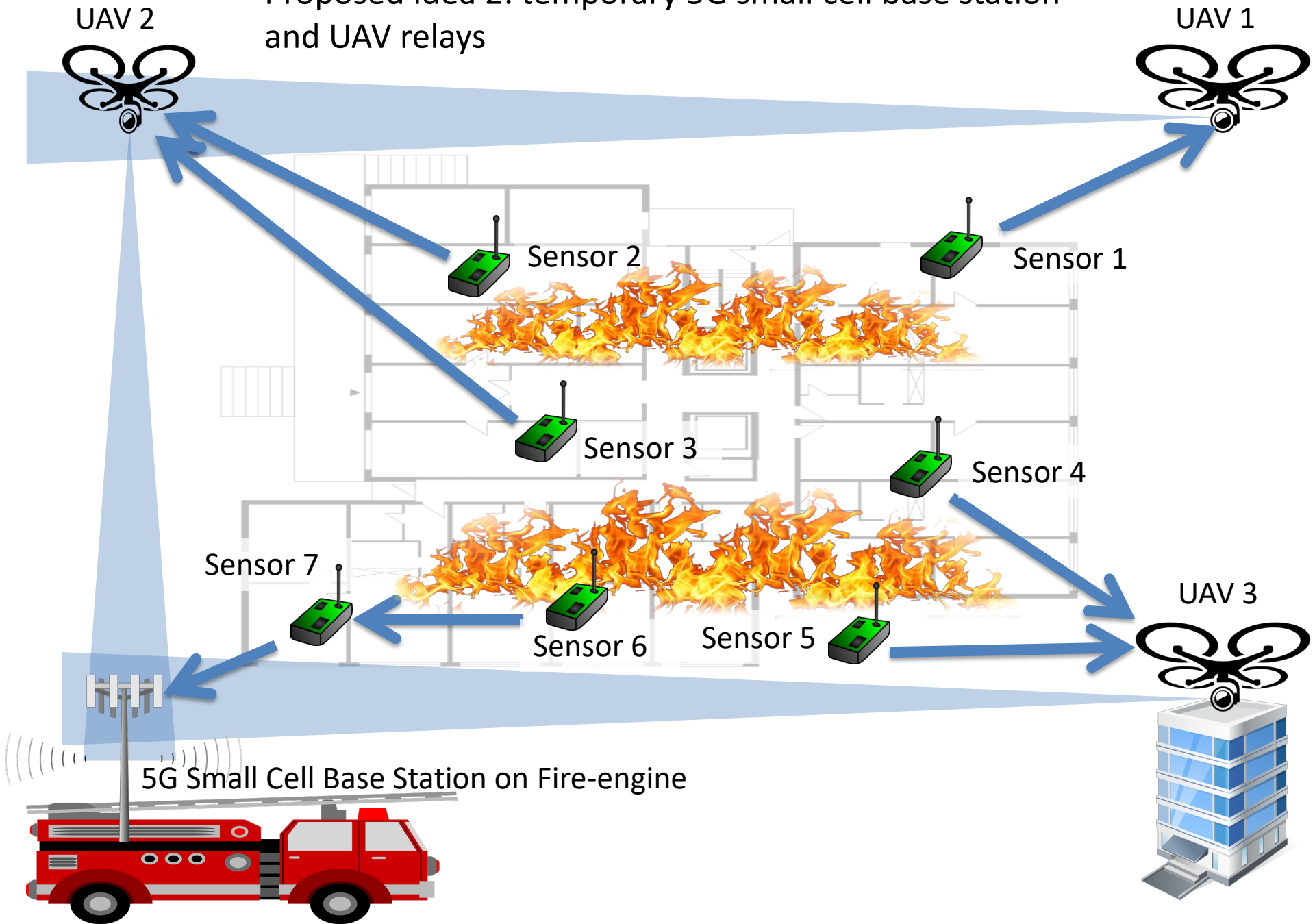
## Breadcrumb networks: state-of-the-art wireless sensor network solution



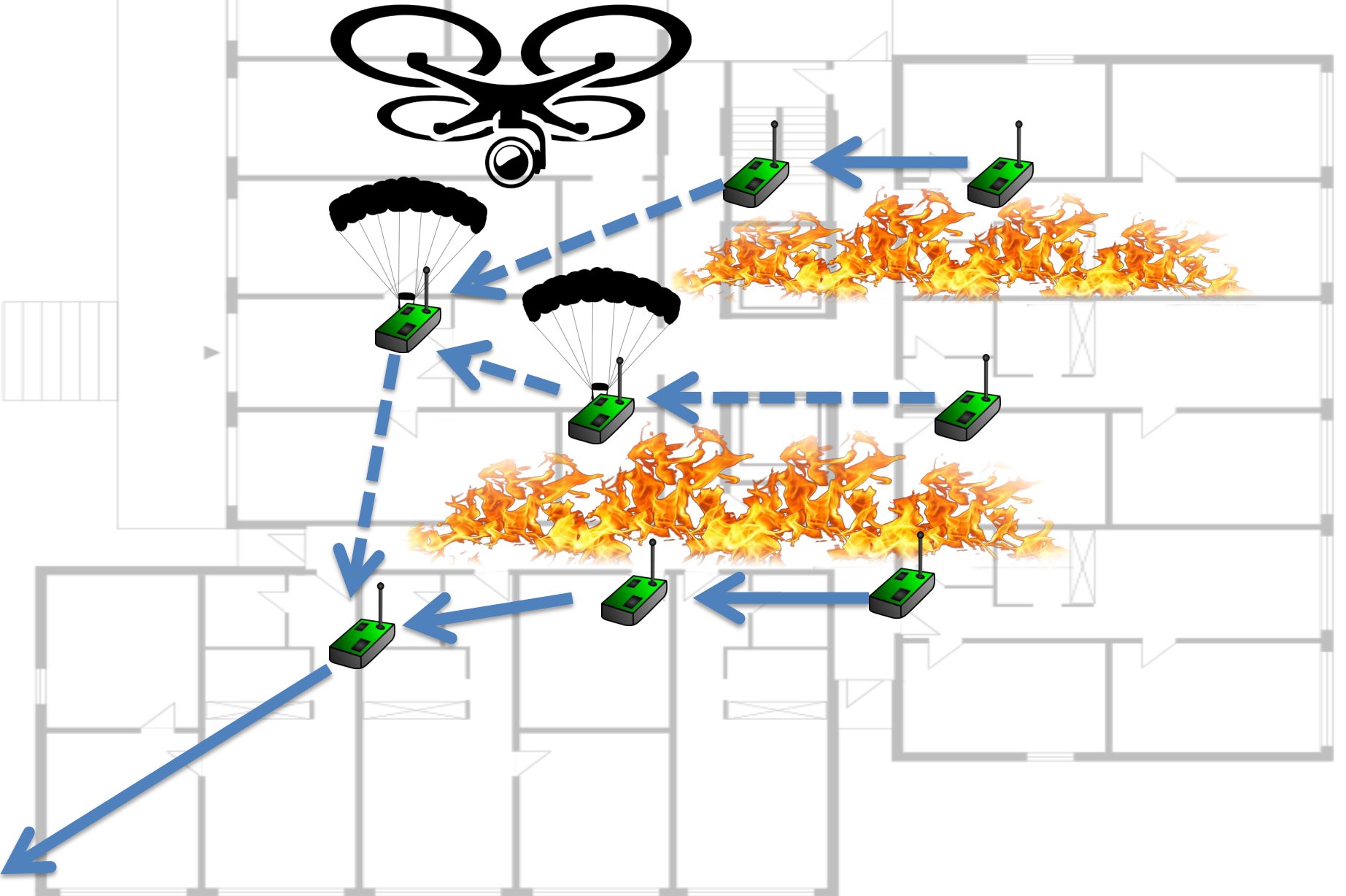
Proposed idea 1: gray fire is the forecasted fire; sensor 1 and 2 are deployed even though it is unnecessary for the sake of monitoring the current fire (the colored fire).



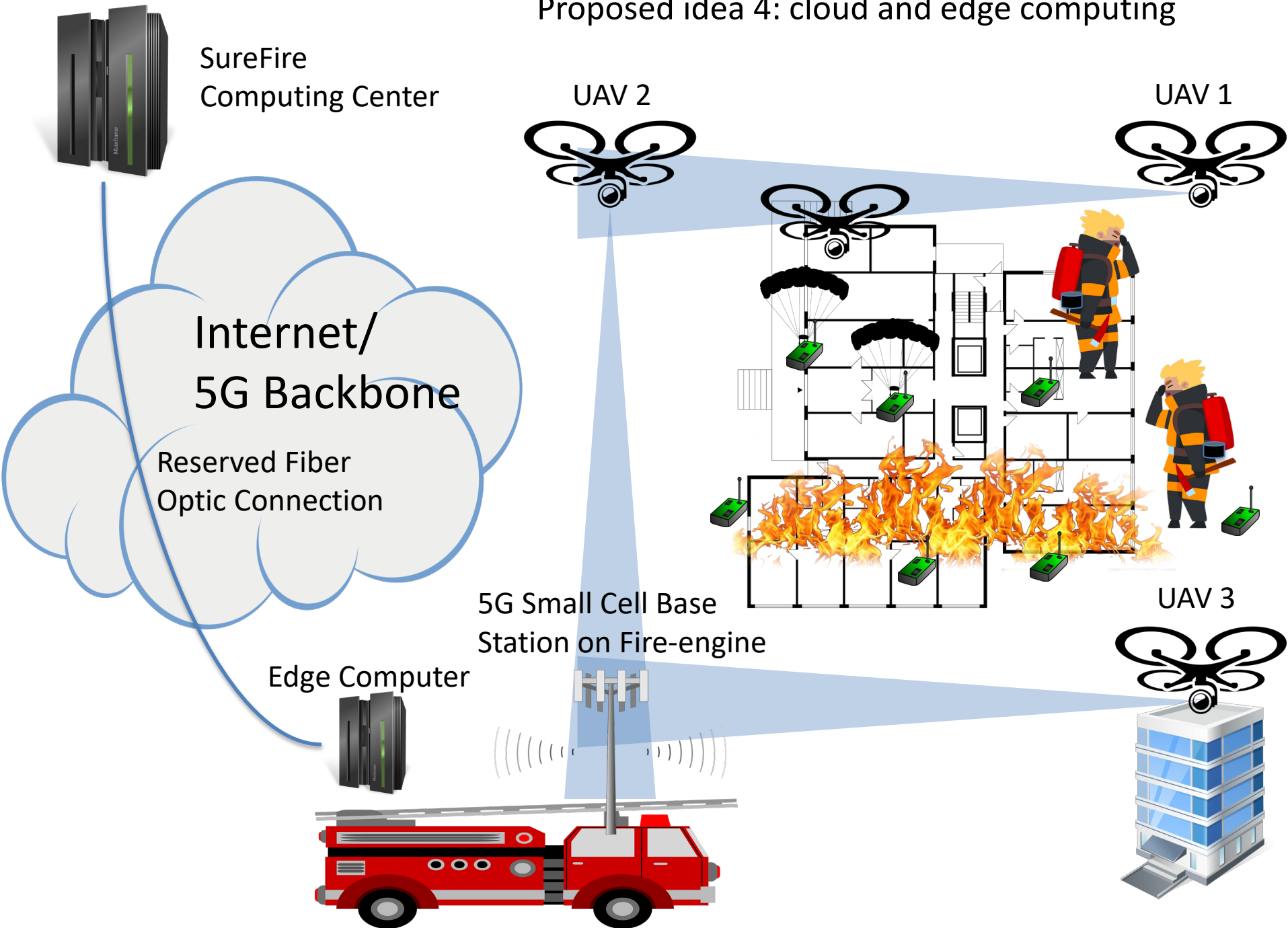
# Proposed idea 2: temporary 5G small cell base station and UAV relays



# Proposed idea 3: UAV fire sourcing and refilling of breadcrumb sensors



# Proposed idea 4: cloud and edge computing





# Proposed idea 4: cloud and edge computing



SureFire  
Computing Center

Internet/  
5G Backbone

Reserved Fiber  
Optic Connection

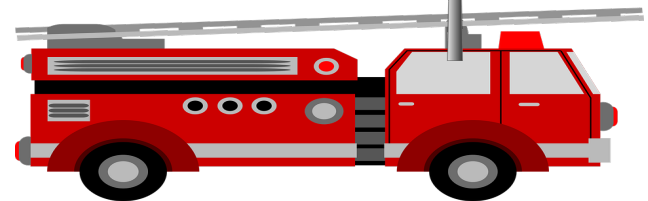
Edge Computer



5G Base  
Station



5G Small Cell Base  
Station on Fire-engine



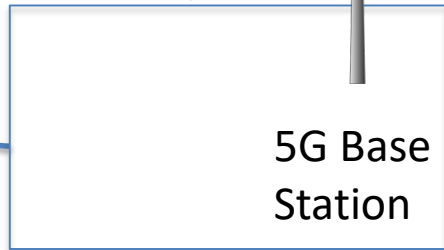
# Proposed idea 4: cloud and edge computing



SureFire  
Computing Center

Internet/  
5G Backbone

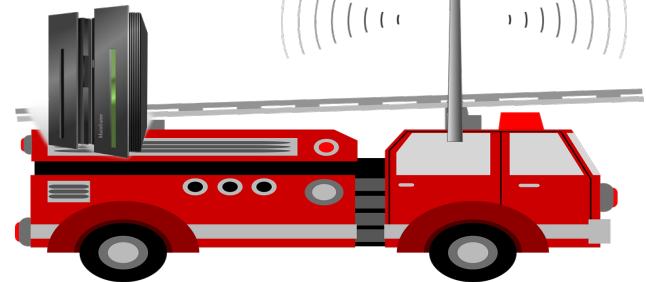
Reserved Fiber  
Optic Connection



5G Base  
Station

5G Small Cell Base  
Station on Fire-engine

Edge Computer  
on Fire-engine



# Proposed idea 4: cloud and edge computing



SureFire  
Computing Center

Internet/  
5G Backbone

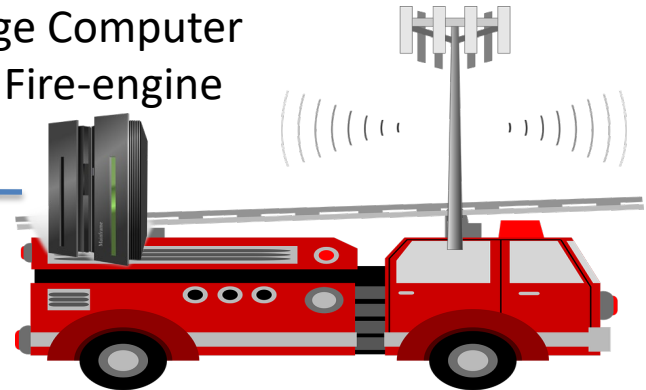
Reserved Fiber  
Optic Connection

Nearby Last Hop  
Fiber Switch

Ad Hoc Fiber  
Connection

Edge Computer  
on Fire-engine

5G Small Cell Base  
Station on Fire-engine



Equipment *	Quantity	Estimated equipment size	Estimated equipment cost ** (if needed to be purchased)	Purpose (e.g. demo, experiment, prototyping, etc.)
DJI M100	2	70.1cm * 70.1 cm *21.8cm length*width*height	HKD25,596 * 2 = HKD51,192	unmanned air vehicular prototyping
Jetson AGX Xavier Developer Kit	2	10.5cm*10.5cm*3cm	HKD 6,216 * 2= HKD12,252	Embedded computer for smart vehicles/drones and development kit.
<u>Cohda</u> Wireless MK5 OBU	2	40cm*20cm*10cm	HKD30,000 * 2 = HKD60,000	Onboard Unit for vehicular network
<u>Cohda</u> Wireless MK5 RSU	1	40cm*20cm*10cm	HKD30,000	Roadside Unit for vehicular network