CONIX RESEARCH CENTER

Computing On Network Infrastructure
for Pervasive Perception, Cognition
and Action

Scout it Out! Navigating with Drones

Anh Luong[‡], Hang Qiu[†], John Miller[‡], Joseph Noor[*], Joshua Adkins[§],
Lucas Fraile[*], Marcus Lucas[*], Nat Snyder[*], Omar Hussien[*],
Weiwu Pang[†], Yuhao He[†], Paulo Tabuada[*]

UCLA, †USC, ‡CMU, §UC Berkeley

Objectives for Task 1.2
(Enhanced Situational Awareness at the Tactical Edge)

1. Machine learning for resilience
2. Safe, secure, smart and scalable programming
3. **Spatio-temporal awareness***

   Precise choreography of actions in time and space among drones and other networked autonomous systems
4. **In-network coordination and control***

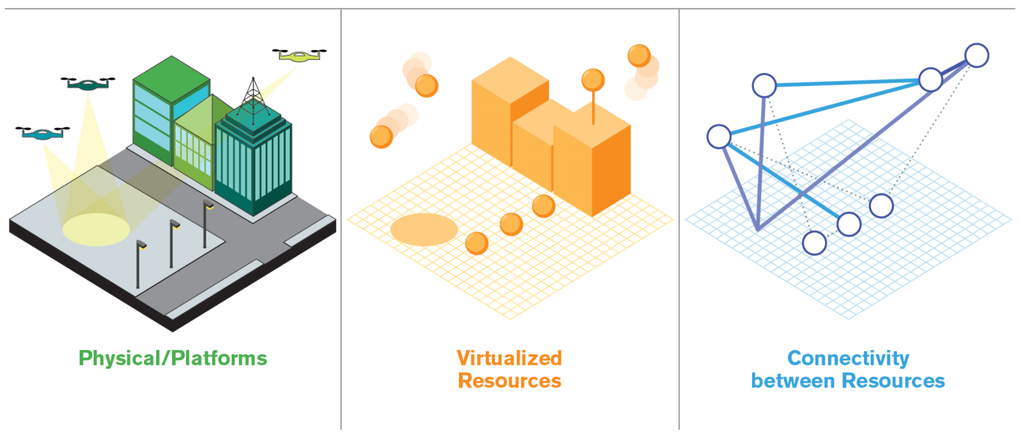
   Multiple feedback loops among networked cooperating autonomous systems
5. Cognitive architecture and accelerators for the edge

***focus of demo**

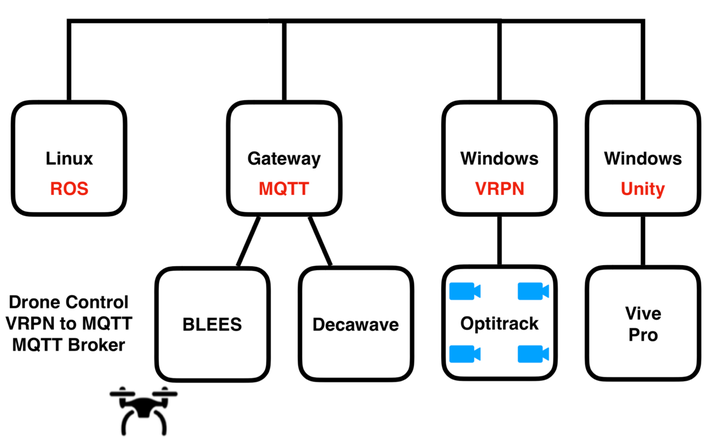
Objectives for this demo

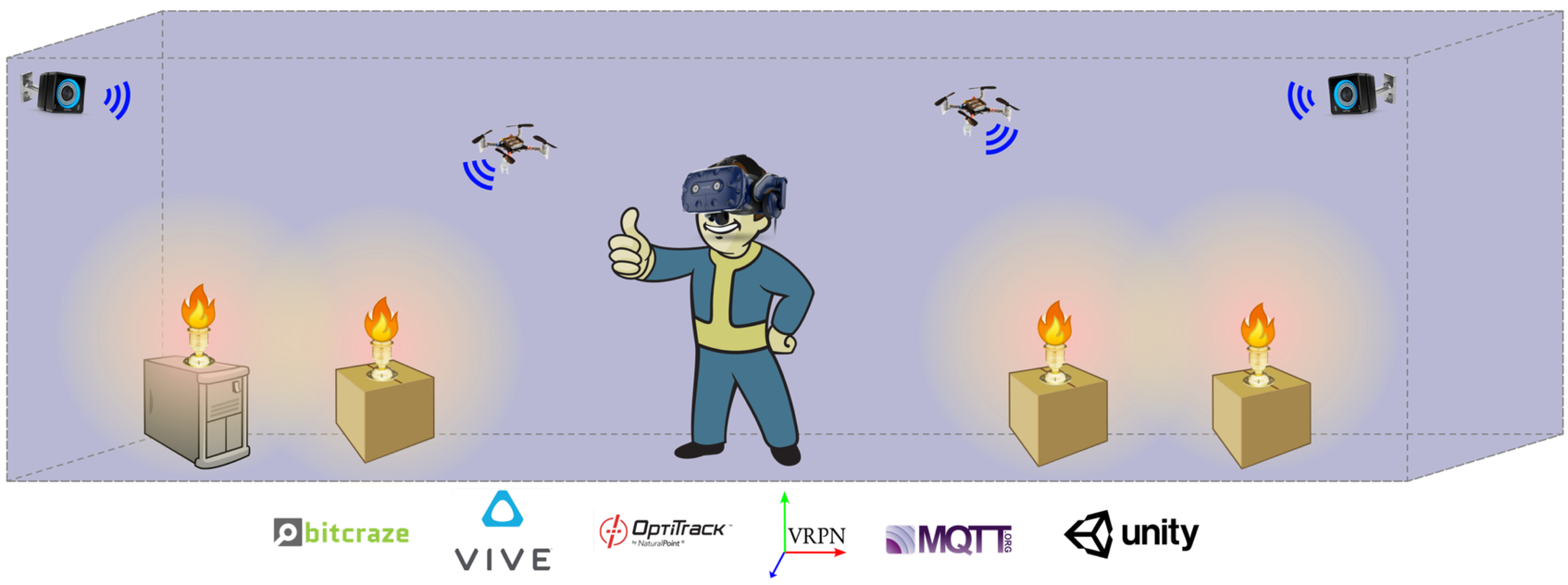
Illustrate Task 1.2 objectives (3) and (4) by:

- Deploying a drone in a hazardous area
- Scout area while avoiding obstacles
- Identify all potential hazards
- Display hazards in virtual reality headset
- Enable individual's safe navigation



Demo Illustration





UCLA: Drone Control

- Drone control expertise using Bitcraze Crazyflie 2.0, ROS, and OptiTrack
- *Task 1.2 Physical/Platforms*

USC: Visualization

- Data visualization via Vive Pro HMD interfaced with VRPN and MQTT
- *Task 1.2 Virtualized Resources*

CMU: Integration and Coordination

- Cross technologies compatibility and networking
- *Task 1.2 Connectivity between Resources*

UC Berkeley: BLEES sensing platform

- Sensor that reads light, temp, humidity, pressure, RF and magnetic field
- *Task 1.2 Physical/Platforms*

SRC JUMP

This work was supported in part by the CONIX Research Center, one of six centers in JUMP, a Semiconductor Research Corporation (SRC) program sponsored by DARPA.

www.conix.io