Next Generation Standoff Explosive & CWA Detector

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SAFR – Situational Awareness for First Responders

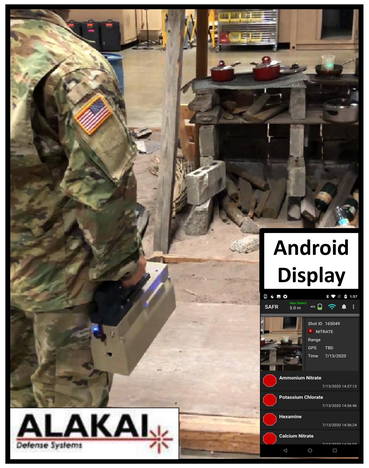
FASTER, FARTHER, SAFER Detection

Benefits
- First one-handed UV Raman sensor
- Standoff range 0.5 – 5m
- Point & Shoot, easy to use
- No sample prep
- Measure hard to reach samples
- Sample through clear plastic bags
- 3.5-5.5 lbs depending on options

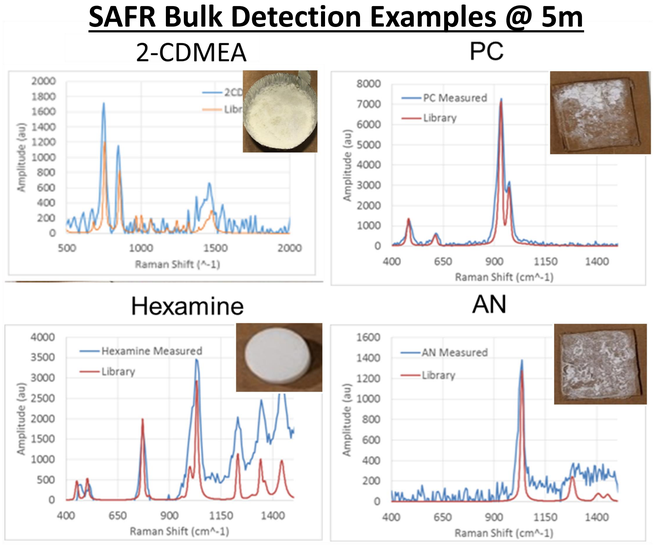
Enhanced Safety
- Will not ignite any sample
- Utilizes Alakai's Patented Stimulated Aversion Eye-safety approach
- Can not cause permanent blindness

Advantages of Deep UV Raman
- Higher Raman signal due to $1/\lambda^4$ dependence.
  - ~100X more signal than other NIR Raman sensors
- Greatly reduced noise due to fluorescence free operation and immunity to ambient light.
- Eye safe advantages: 600X higher permissible energy than in VIS and IR (ANSI Z136.1).

No Performance Degradation Outdoors

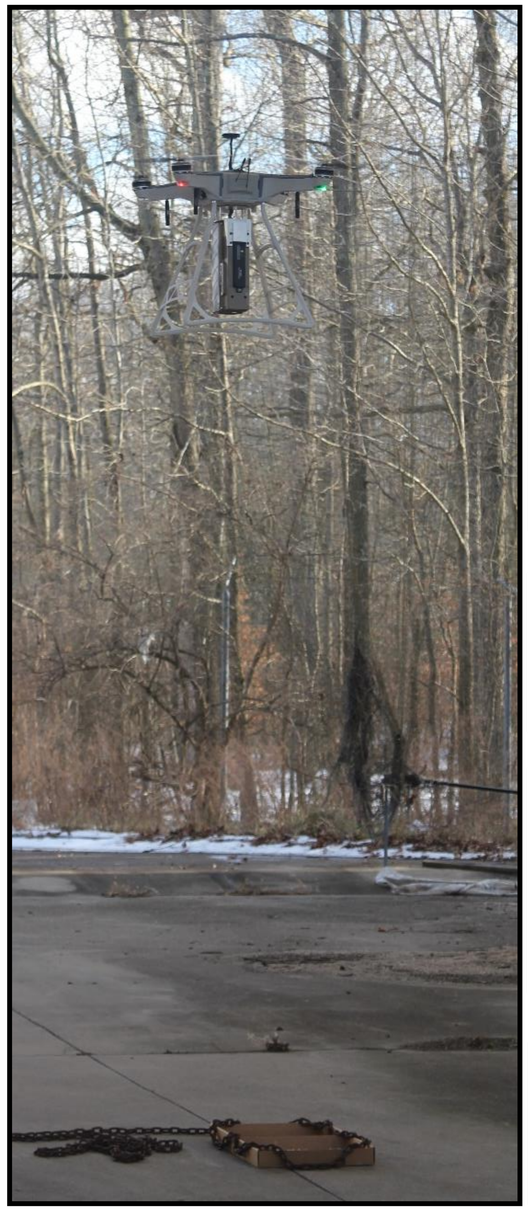


SAFR Bulk Detection Examples @ 5m



First Known Standoff UAV Detection

SAFR on Deep Purple UAV



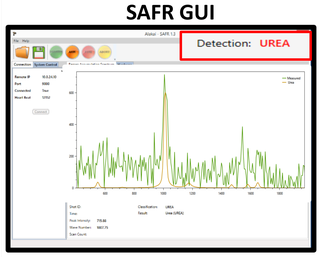
Goal : Successfully detect HME @ 3-5m using SAFR & UAV

Result: Achieved 3m detection, too windy for 5m without "video lock" UAV flight system

SAFR on Deep Purple

UAV Control Screen

SAFR GUI

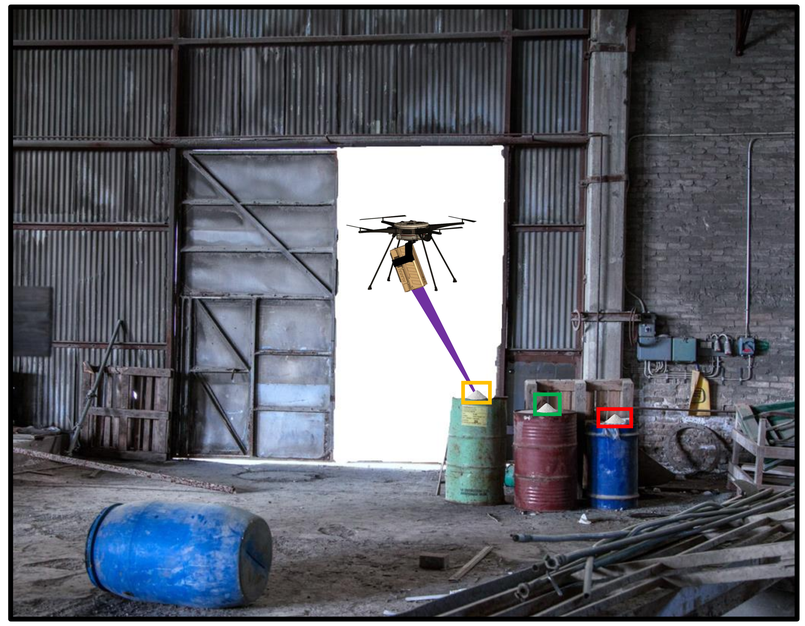


Sample to be Interrogated

Lessons Learned

- Greater than 2m Standoff is Extremely Important
  - At 2m and below, prop-wash form UAV will blow away small to medium piles of powder
    - Instruments with shorter range
- A stabilized sub-mount is highly desired
  - Stabilized mounts exist already for high-res cameras, only a slight repackaging needed
  - Allows independent control of analysis spot
  - And more rapid target acquisition and faster sampling

Other Autonomous Applications



- SAFR & AI can aid in Force Multiplication
  - AI and Machine Learning, can be employed for Automatic Target Recognition and Selection
  - Autonomous operation--system could automatically sample an area with no Soldier involvement
  - Swarms of low-cost sensors can provide more thorough and faster sampling than classic systems
  - Keeps the Soldier farther away from hazardous environments

Future Plans

- Improve maturity
- Game changing capability allows new CONOPS
- Develop high performance SAFR-2 version for trace detection and longer range