

## QUANTUM TECHNOLOGIES, METAMATERIALS, AND THE FUTURE OF CB SENSING

### Low-SWaP-C Colorimetric Detection Of Vapor-phase Chemical Threats

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Colorimetric chemical sensors are some of the simplest and low-cost sensors available to the Warfighter today. Advancements in small, chip-based optical readout packages, coupled with low-power electronics and wireless communications modules, have allowed for the development of a hands-free colorimetry-based chemical sensor that effectively acts as self-reading M8 paper that responds to vapor-phase chemical threats. We have designed a low-SWaP-C, baseball-sized prototype that can be kinetically deployed by the Warfighter to act as a remote point sensor to provide early threat notice for sensitive site assessment missions. Other uses for this sensor modality include perimeter defense, wide area chemical surveillance, and remote point sensing via unmanned platform integration. We have also explored other form factors to increase the distance of the kinetic employment to include a 40-mm flare round that can be effectively sent downrange to probe a suspicious area. By integrating these sensors into the tactical communications network, opportunities exist to create unit-scale mesh chemical sensor networks. These prototypes have been tested against toxic industrial chemical (TIC) vapors in the lab, have been put in the hands of the Warfighter at CBOA, and the dyes being used for detection are currently undergoing surety testing against select chemical agent threats.

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