

## INNOVATING CROSS-DOMAIN SOLUTIONS TO DETECT EMERGING BIOLOGICAL THREATS

### Computer Vision For Multiplex Assay Detection

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Multiplex assays help determine the constituents in a complex mixture of nucleic acids or proteins. Examples include loop mediated isothermal amplification (LAMP) for DNA/RNA and lateral flow immunoassays (e.g. Blind Spot) for proteins. Unfortunately, as the number of multiplexed samples increases the interpretation can become complex or require specialized, expensive analytical devices. To improve access to these technologies, especially for field use by warfighters, we created a computer vision application that can rapidly quantify color change results with the goal of providing this software on portable computing devices, like smartphones. We compared the results from our prototype computer vision app measuring results from a 96-well plate of sixteen colorimetric LAMP assays as well as a Blind Spot chip to detect toxoid proteins from human threat agents. In this study, we showed increased reproducibility of interpretation and a lower limit of detection using computer vision. The benefits of these methods can provide a fieldable multiplex assay type to the warfighter having lower user burden with robust quantitative analysis.