

# Exploring Homeland Security Applications for Unmanned Autonomous Systems at Maritime Ports

## CARGO SECURITY AND EXAMINATIONS

Each year, more than 11 million maritime containers arrive at U.S. seaports. At land borders, another 11 million arrive by truck and 2.7 million by rail. U.S. Customs and Border Protection is responsible for protecting the public from terrorists and transnational criminal organizations and materials while enhancing the Nation's global economic competitiveness by enabling legitimate trade and travel. Key requirements of security and prosperity are knowing what is inside the containers, whether the contents pose a risk to the American people, and ensuring all proper revenues are collected. There are limitations on CBP's ability to examine the high volume of cargo arriving at US ports. Scanning containers through stationary non-intrusive inspection systems is time consuming and moves containers out of standard logistics flows. Physically inspecting each container is even more disruptive to the supply chain and requires an enormous amount of CBP officer time.



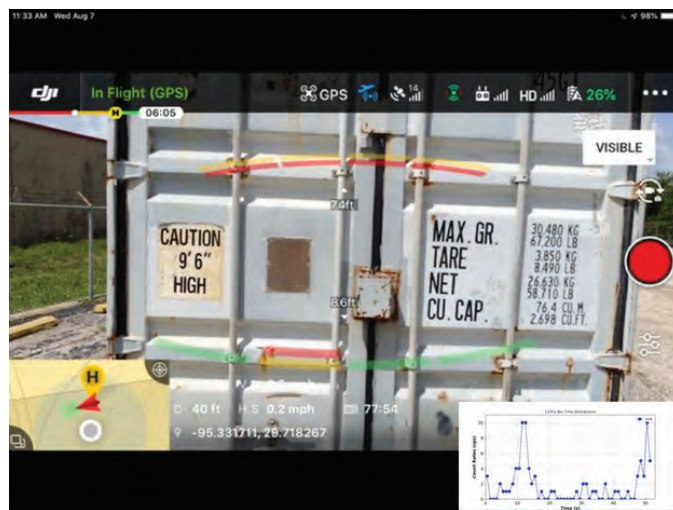
## TECHNOLOGY AS AN ENABLER

Unmanned Autonomous Systems (UAS), fitted with sensors and cameras, represent a breakthrough combination of technologies enabling CBP officers at maritime or land ports to efficiently and effectively screen a greater percentage of cargo containers.

## UAS-BASED SENSORS

Integrating thermal imaging and radiation detecting sensing capability on a mobile, remotely controlled UAS platform has created a next generation tool to deter, detect and facilitate interdiction of future smugglers of contraband.

A functional prototype UAS platform was developed capable of detecting minute amounts of radioactive material several feet outside the wall of a standard maritime shipping container or a passenger vehicle. Thermal imaging capability of this platform can identify voids in insulated containers often used to smuggle contraband. Importantly, the speed and resolution of this sensing platform is operationally feasible for virtually all current ports of entry into the United States.



There are a large number of scenarios where UAS-based sensors can be a force multiplier for the Department of Homeland Security. From thermal imaging of freezer containers to collecting swipes from handles or vents that might otherwise be too dangerous for an officer to collect, the use of UAS systems could significantly enhance an officer's capabilities to protect the public and enable legitimate trade and travel.

For research process, technical details, and additional applications, please see the full report.

Based on Project Final Report available [www.uh.edu/bti/research/lantern-uas](http://www.uh.edu/bti/research/lantern-uas)  
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