



# STIC Note

## 3D Bounce Ball Camera



### BACKGROUND

There are several Coast Guard missions where the ability to see areas before placing personnel in those areas can be useful. Some examples include clearing and securing spaces on ships to survey possible dangerous spaces before entry by boarding teams, or situations that require the inspection of enclosed, overhead, and confined spaces. There are a few technologies that exist that can help in these situations, they include GoPro cameras on a pole, small uncrewed aerial systems, and borescope cameras. One of the technologies that shows promise are throwable cameras, such as those produced by Bounce Imaging. In September 2022 the Science and Technology Innovation Center (STIC) saw the Bounce camera (Figure 1) in use at a US Navy demo and decided to investigate whether it would be applicable for use in CG missions.



Figure 1. Ball camera (Source: U.S. Coast Guard).

### EVALUATION

The Bounce camera chosen for evaluation was the RECCE360 Mini. This baseball sized device with six cameras recessed around its exterior, has a hard rubber coating that makes it resilient, water resistant, and easy to throw.



Figure 2. Remote Quad Screen Display from the ball cameras (Source: U.S. Coast Guard).

The ball can be rolled, thrown, or attached to a tether, pole, or magnet. It has a range of approximately 120 ft, depending on interferences, and connects via Wi-Fi to any Wi-Fi capable mobile device (Figure 2). It has a battery life of approximately three hours on a single charge of its internal rechargeable battery. The six cameras, internal accelerometers, and software are programmed to maintain the same view orientation as when the operator throws it, and the multiple cameras allow for a rotatable 360-degree view. As seen in Figure 2, the system also has a feature that allows splitting the display into four screens. The four screens can then be manipulated to have

each camera present a different viewpoint allowing different angles which can be individually zoomed to focus on specific details.



Figure 1. Examples of camera use, Top: Pole mount, Bottom: Dog leash (Source: U.S. Coast Guard).

The STIC worked with the USCG Maritime Security Response Team East (MSRT-E) in Chesapeake, VA to evaluate the system. A test plan was developed to assess the camera in a scheduled training mission at the Academi Training Facility in Moyock, NC. This training occurred in several mock residential facilities, or

“shoot houses”. Based on initial positive feedback from this training, the next step was to determine how it would perform aboard a steel hulled ship. The camera was tested aboard the T/S SHUMAN at the CG Academy with a follow-on test aboard a larger ship, the M/V Cape Ray in Portsmouth Virginia.

## CONCLUSIONS

MSRT East’s conclusion was that the RECCE360 Mini is a tool that can help law enforcement teams to clear spaces by seeing into them prior to physical entry. It is easy to use, compact, and easy to carry. It does a good job of displaying a scene and allows the operator to identify dangerous situations before exposing themselves to the danger.

Multiple tablets or phones can view the cameras simultaneously. Sessions are recorded and can be accessed from the phone or tablet.

There were several complaints with the system:

1. The on/off switch is difficult to operate. This wasn’t a concern when using the device but rather when ensuring the system was shut down before storing it so as not to drain the battery.
2. During the evaluation on larger ships, it was difficult to control the ball and get it to end up where the team desired due to the constant motion caused by the sea. The pole and dog leash were much more effective (Figure 3).
3. The playback of the recording does display a time stamp however it is not displayed on the actual images of the playback.

A Range Extender (Figure 4) was purchased from Bounce Imaging to see if the range could be

improved. It was found that the Range Extender is bulky and not easily worn or carried. It works as a signal relay but syncing it to the camera was at times difficult.



Figure 2. Range extender (Source: U.S. Coast Guard).

Attempts were unsuccessful to relay the signal from the camera to the ATAK (Android Team Awareness Kit). ATAK is used to share images, in real time, with other boarding teams who are also monitoring ATAK. Without this it is not possible to monitor several ball cameras from a single tablet or mobile device.

## FUTURE WORK

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The system was transferred to the MSRT-E Team for further evaluation. A second system was provided to the Response and Prevention Branches at Sector Long Island Sound (SLIS) for continued evaluation.

The Science and Technology Innovation Center (STIC) is a DHS S&T and USCG collaboration.