



STIC Note

Handheld FLIR Technology



BACKGROUND/PROBLEM

In the early 1990s, the CG Research and Development Center evaluated Night Vision Goggles (NVGs) as an aid for Maritime Search and Rescue; they found that NVGs were an effective nighttime search aid, but were ultimately too expensive to justify unit-level purchase. Since then, low-cost handheld monocular thermal cameras with less advanced capability have appeared on the market. This task was developed to evaluate these reduced cost, commercial-off-the-shelf handheld thermal cameras for night operations.



Figure 1. Low-cost FLIR Ocean Scout 640 Thermal Camera.

METHODS

The STIC team conducted market research to determine the best quality-to-value handheld thermal cameras on the market. The models were evaluated using the following criteria: portability, display resolution, ruggedness, range and zooming capabilities, and cost. Using these criteria, two FLIR models were selected for evaluation: FLIR Ocean Scout 640 Thermal Camera and FLIR LS-XR Handheld Thermal Imaging Monocular.

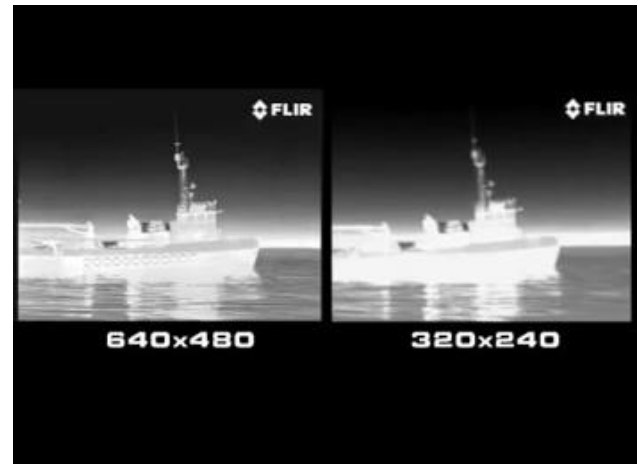


Figure 2. Thermal image taken by FLIR Ocean Scout 640 Thermal Camera.

EVALUATION

The FLIR Ocean Scout 640 underwent operational test and evaluation at STA New Orleans and STA Ketchikan, two small boat stations equipped with 29' Response Boat-Small (RBS) assets, and aboard USCGC OLIVER HENRY, a Fast Response Cutter (FRC). The RBS platform was chosen because it exhibited operational need; the 29' RBS is the only active CG smallboat that has no standardized night vision or infrared capability onboard. Small boat crew evaluators used the device on average between 1-2 times a week during night operations over a period of three months. Crews maintained that it was particularly helpful for search and rescue operations (where red hot/white hot IR is needed) and that it was compact, comfortable to hold, and easy to stow. Complaints about the device included that it temporarily ruins night vision adaptation and that it was not very useful

in very dark areas, due to its lack of additional night vision. Best performance of these devices is achieved when there are large temperature differences on the target; conversely, they are not as good with uniform backgrounds.



Figure 3. Top and side views of FLIR LS-XR Handheld Thermal Imaging Monocular.

USCGC OLIVER HENRY was tasked with evaluating the FLIR Ocean Scout 640 against the FLIR LS-XR Handheld Thermal Imaging Monocular.

OLIVER HENRY is a Fast Response Cutter (FRC) and is equipped with an IR system, but the crew found the handheld FLIRs very useful when used on watch. Watchstanders used one or the other device hourly throughout the three-month evaluation period. Like the small boat crews, they found it very useful during search and rescue evolutions. The crew found the FLIR LS-XR provided a higher quality image and preferred it to the Ocean Scout model. The only downside noted to using one of these devices aboard the cutter is that they easily fog up due to humidity when used inside; the user needed to step outside for maximum efficiency.

CONCLUSIONS

After several months of field testing, the feedback for both handheld FLIR devices was overwhelmingly positive. Two of three testing units recommended the FLIR Ocean Scout 640 (\$2K) for fleet-wide purchase. The dissenting opinion came from STA Ketchikan, whose crews felt that the Ocean Scout 640 was only useful for areas that had some background lighting and that in the dark areas of Alaskan waters, it became nearly impossible to use it to determine one's position or area of search. USCGC OLIVER HENRY crew preferred the FLIR LS-XR, which provides higher quality night vision but also comes at higher cost (\$2.6K), and recommended either unit for purchase by FRCs in the fleet. The level of technology improvement for the cost makes this a useful addition to the mission execution toolkit.

FUTURE WORK

A fourth FLIR Ocean Scout 640 was distributed to a WMSL for evaluation and then delayed due to operational concerns. Further feedback from this unit is pending. Additionally, evaluation of thermal imaging devices in conjunction with other night vision devices may be warranted to address the need for night vision in dark waters, such as at STA Ketchikan.

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