



STIC Note

Stabilized Binoculars



BACKGROUND/PROBLEM

Scanning the ocean surface for vessels, objects, and humans is an important task for Coast Guard missions, however it can be difficult for an operator to lock-on to a target with the constant movement of ocean waves. The Science and Technology Innovation Center (STIC) was tasked with researching technologies that minimize the effects of waves on an operator's ability to view a target. To assist the crew responsible for detecting objects at sea, STIC identified stabilized binoculars as a viable technology to help minimize these effects. Stabilization mechanisms compensate for movement of the binoculars, which is important when viewing an image at high magnifications.

METHODS

Coast Guard operations take place in coastal environments and waterways, and in highly variable weather conditions. Therefore, STIC focused the market research on fog proof and waterproof stabilized binoculars. The STIC team also contacted the National Urban Security Technology Laboratory (NUSTL), which had previously researched and evaluated stabilized binoculars. NUSTL provided documentation from the System Assessment and Validation for Emergency Responders (SAVER) Program, which assessed stabilized binoculars based on criteria set by emergency responders. The SAVER Program considered the affordability, usability, and capability to be essential criteria when purchasing binoculars.

The SAVER Program considerations were also incorporated into the STIC team's market research. Four pairs of binoculars were purchased: three stabilized models at several price points and one non-stabilized marine binocular for comparison. Table 1 lists the binoculars purchased, lens specifications, and the corresponding price. To evaluate the binoculars in varied tasks and settings, all four binoculars were shipped to four units for approximately four weeks of limited user testing and evaluation.



Figure 1. Fraser Optics M25E at STA YAQUINA BAY.

Feedback was collected from operators through survey questions. Operators provided information on their required tasks to perform, the task's duration, and the environmental conditions. Survey responses also included feedback on the binoculars' image quality, ease of use, and overall performance.

Table 1.

Model (magnification x objective lens diameter)	Price
Fujinon Techno-Stabi (14x40) (stabilized)	\$1000
Fujinon Stabiscopes (12x40) (stabilized)	\$4700
Fraser Optics M25E (14x40) (stabilized)	\$3000
Steiner (7x50) (non-stabilized)	\$800

EVALUATION

The binoculars were shipped to four units for evaluation: CGC NORTHLAND, CGC OLIVER HENRY, STA CAPE CHARLES, and STA YAQUINA BAY. All of the stabilized binoculars received net positive feedback from the platforms in tasks ranging from bar reports to scanning for contacts and other vessels.

The Fujinon 12x40 was the most highly rated model. The model was described as clear, steady, and quick to focus. An operator from CGC NORTHLAND commented that the stabilized binoculars facilitated an observer’s ability to detect detailed features on a target, such as boat numbers or vessel names. One operator from STA YAQUINA BAY stated that the Fujinon would be particularly useful when searching for a person or debris in the water. This model is the most expensive, but STA YAQUINA BAY reported that the value added to operations would justify the cost.

The Fujinon 14x40 and the M25E were also well-rated, but some operators stated the stabilization took too long to activate and it was difficult to lock onto a target. STA CAPE CHARLES reported that the M25E produced the best clarity and stability, but the Fujinon 12x40 was

less cumbersome and easier to use, and would end up being used more often as a result.

Despite the positive feedback, a few operators mentioned that due to the slight delay in image stabilization, the stabilized binoculars’ usefulness may be limited in high seas and the nonstabilized binoculars are preferred in such conditions.

CONCLUSIONS

The stabilized binoculars received positive feedback from the units performing operational evaluation. The enhanced magnification capability combined with image stabilization allowed operators to view smaller objects at a distance and in greater detail than typical marine binoculars, which are roughly half the magnification of the stabilized models. The stabilized binoculars are recommended as an additional tool to assist operators to lock-on to a target with the constant moving of ocean waves and not as a replacement for nonstabilized binoculars. The Fujinon 12x40 stabilized binoculars had the most positive feedback and are the most expensive. The M25E had the second most positive review and is the second-most expensive stabilized binocular.

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