# HAPTICS FOR SMALL FAST CRAFTS

SMARTSHIP

FEELING IS BELIEVING

MARIN

## INTRODUCTION

June 2019:

Smart-Ship starts research in the field of mitigating physical impact for crews sailing on small fast ships by making use of haptic feedback in the gas lever. During the research Smart-Ship cooperated with MARIN (Maritime Research Institute) and the Royal Netherlands Navy. The research was concluded in January 2020 with specialized testing on the motion-based Fast Small Ships Simulator at MARIN. The newly developed Smart-Ship lever guided the highly qualified operators on a safe sailing speed in relation to the wave conditions that were being encountered.

## TEST RESULTS

The results show that the expert users sailed noticeably more continuous, with a similar average speed and less encountered shocks compared to situations without haptic feedback. In addition, the operator was required to deliver significantly less control input. This resulted in a lower control effort, which indicates that he could continue his tasks longer and with a higher focus.

Next to the safe speed advice several extra functionalities were being tested, which increased the situational awareness further. The general conclusion of the research is that haptic feedback is an important and desirable addition while operating small fast ships to increase safety and situational awareness.

# THE PRODUCT

Smart-Ship's haptic lever continuously communicates a safe sailing speed to the operator by guiding forces in the lever. The advice is based on the wave conditions the ship is encountering. As haptics is focused on continuous human-machine interaction, it allows the operator to either follow or overrule the given advice at any time if deemed necessary.

In the first place the research was focused on transferring a safe speed advice. However, the algorithm behind the lever makes it possible to communicate all sorts of advice to the operator such as information regarding engine temperature, sailing through shallow waters and high-speed navigation.

Such information can be transferred by an invisible force in the lever, a guiding force, warning vibrations or clicks indicating several engine settings.

# THE BENEFITS

The results show the following benefits of using haptic controls for small fast craft:

- Increased safety
- Increased situational awareness
- Decreased physical workload
- Decreased mental workload
- Increased attention span

The continuous feedback eliminates the need for the operator to switch his attention between different sources. This leads to a reduction in the control effort, which increases both safety and situational awareness.

Furthermore, the performace increase results in a decrease in the physical workload and an increase of the attention span of the operator.

**The possible applications are infinite!**
**Curious to see what we can do for you?**
**Get in touch!**

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