

Efficient Drone Control in Emergency Situations

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Dynamic Drone Control Interface to Make Sea Rescues Safer And More Efficient

Swedish Sea Rescue Society is currently involving drones to make sea rescues safer and more efficient. What design principles are important for a drone control interface adapted for sea rescues?

Existing drone control interfaces are usually adapted to non-dynamic use cases, such as inspection and scanning. In these situations one can assume that the operator has necessary information to perform these missions. However, when there is an incoming alarm for a sea rescue, the information is usually insufficient. Sometimes it is even inaccurate or contradictory. On top of that, the situation can change quickly. This is why an interface adapted for dynamic control of drones is needed.

The Swedish Sea Rescue Society's goal is to use drones in their sea rescues by flying a drone to the location of an alarm and gathering information with its camera. However, the drone has to be at the location of the alarm before the sea rescue crew has left the shore, which usually is within 12 minutes. The live video feed from the drone's camera will expediently facilitate a better understanding of the situation which in turn will allow the rescue crew to conduct relevant preparations and provide compatible help. All in all, the Swedish Sea Rescue Society aims to make sea rescues more efficient and safer by involving drones.

Let's dig into the requirements of the drone control interface. Since the drone has to be at the location of the alarm within 12 minutes, the interface has to assist the operator in operating fast. Besides that, the drone will be out of sight of the operator when being controlled which implies a security risk. Thus, the interface has to assist the operator to conduct the flight safely as well. This includes minimizing sending undesired commands to the drone.

To be able to design an interface that fulfills these requirements, there have been interviews, questionnaires, and usability testings with potential end users that have experience of drones, aviation, or sea rescues. These activities have given insights about user's expectations on the interface and why certain misconceptions are made. All of this resulted in a drone control interface that now has been used several times to control the Swedish Sea Rescue Society's real drones.

Finally, the results from the usability testing and when the interface was used to control real drones laid the foundation for a few conclusions regarding important design principles. Firstly, it is fundamental to match the user's mental model to achieve fast and safe drone control. Moreover, it was essential to use the user's terminology and to include error prevention. In addition, it was effective to limit information, both the amount of it and distribution within the interface. Lastly, it was observed that implementing flexible processes does not always imply that users can perform tasks faster.