

# Vehicle Submersion Safety System

*Automatic Window Opening System (AWOS)*

Every year in North America, up to 10% of all drownings are caused by Vehicle Submersion that also accounts for thousands of deaths worldwide. Vehicle Submersion has the highest fatality rate of any type of single vehicle incident.

The main problem is that occupants make bad decisions such as making emergency phone calls; trying to open the doors or making no efforts at all, because they don't know what to do. Occupants fail to quickly exit the vehicle through an open or broken window.

KAUST (King Abdullah University of Science and Technology) is proud to announce that it has produced an effective Automatic Window Opening System (AWOS) that will prevent thousands of vehicle submersion drownings each year by providing exits (automatically opened side power windows) through which occupants can escape.

## TECHNOLOGY OPPORTUNITY



## Benefits

- Ultra rapid water immersion detection sensor
- Immediate activation of all side power windows to open at their full velocity
- Will safely only open windows when the car is in a safe upright position
- Mitigation of false alarms by a sensor that differentiates between water from a splash on the road versus an actual immersion in a body of water
- Automatic distress call can be sent to an Emergency Call Center such as GM's OnStar system in vehicles equipped with such a system

## Applications

- ▲ Safety device for submerged vehicles
- ▲ Can be easily installed during vehicle assembly or as an after market add-on
- ▲ Innovative design features
- ▲ Works on conventional, hybrid and totally electric vehicles
- ▲ Works on standard as well as express power windows
- ▲ Ongoing system reliability can be quickly & easily verified during routine vehicle checkups

## Opportunity

This technology is part of KAUST's technology commercialization program that seeks to stimulate development and commercial use of KAUST-developed technologies.

Opportunities exist for joint development, patent licensing, or other mutually beneficial relationships.

## For More Information

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## Technology Details

The AWOS system was conceived and developed by a multidisciplinary team of experts in Vehicle submersions; Vehicle electronics systems and Advanced Sensor Technology. A floating vehicle may take 2 - 4 minutes to completely submerge below the water surface; however, occupants have only ONE MINUTE (The Floating Phase) during which escape is possible. The only way to survive a vehicle submersion is to exit through the side power windows which need to be opened or broken as quickly as possible.

That is why KAUST's AWOS system is so important. It does all the right things without any human intervention while there is still ample time to lower all side power windows.

Dr. Gordon Giesbrecht PhD, FAsMA  
World Expert on Vehicle Submersions

## Why It Is Better

The placement of the sensor also enables it to quickly and automatically open the windows in response to detection of an incident, giving the vehicle occupants valuable extra time to safely exit the vehicle before it is fully submerged. A positional sensor can detect the orientation of the vehicle. If the car lands upside down, the center of gravity of the car will cause it to slowly rotate to an upright position. The positional sensor ensures that the windows are only opened once the car has fully rotated to an upright position, to prevent the car filling with water at head level while passengers are upside down.

The system can be fully integrated into any car's existing system to minimize installation time and cost. It can work on conventional, hybrid, and fully electric cars and can be easily tested for operability when the car is being serviced. It can be pre-installed at the factory or installed as an after market component.

## IP Protection

KAUST has an issued patent 9,206,637 and several pending patents for this technology.



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