

ASV

Autonomous Surface Vehicle

System Description

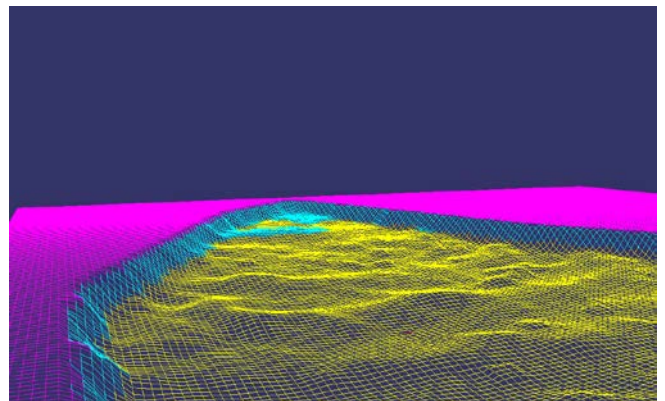
The ASV is a autonomous water surface vehicle, which can perform missions, independently. One future approach is the cooperation with the AUV - Avalon. Using different sensors, the vehicle can create a depth map of an unknown aquatic environment. To achieve this, it plans a route to cover the whole surface of the environment. While driving on the planed route, the ASV collects depth information using the scanning sonar. In the following the depth information is used to create a map of the environment. Besides the scanning sonar, a GPS receiver and an inertial measurement unit are used, to estimate the position of the vehicle and to navigate safely in the environment. In a similar manner emergency behaviors have been implemented, by which the ASV is capable to react on a low battery status and return to a settled maintenance point.

If necessary, a remote control can be used to take over the control of the vehicle and to prevent collisions with other vehicles. This is done by using the mounted waterproof camera. To archive this, a stable and powerful emergency control is implemented on the microcontroller level.

In the future the ASV should operate as an support vehicle during missions of the AUV - Avalon and be the mediator between Avalon and the human control team. During this, the ASV tracks the motion of Avalon using the installed camera and follows the AUV. Using a underwater modem, which is installed in both of the vehicle, a direct communication between them can be ensured. This communication make it possible, that the AUV – Avalon can use the depth map, created by the ASV, for localization and navigate safety in unknown underwater environments.



The ASV on the Stadtwaldsee



Created depth map of the Stadtwaldsee

Technical details:

- **Length:** 1.2 m
- **Width:** 0.9 m
- **Height:** 0.2 m
- **Weight:** 20 kg
- **Power:** 29.6 V LiPo
- **Propulsion:** 6 x DC Motors

Sensors:

- IMU (self build)
- Trittech Echo Sounder
- GPS-Receiver
- The Imaging Source DFK 23G445
- Trittech MicroNav Modem
- WiFi
- AMBER Wireless

Optional sensors:

- Trittech Micron DST Scanning Sonar
- Trittech Super SeaKing Sonar
- Teledyne BlueView P900 Imaging Sonar
- Structured Light laser beam emitter



The Avalon team during a contest with the ASV and AUV

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