# Hybrid Autonomous Living System

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The scarcity of water and land resources, the use of environmentally harmful substances, and food production that is increasingly insufficient to meet the demands of an ever-growing population, drive the research to new and better solutions for a circular agricultural production. We created H.A.L.S., a system that hybridises several unconventional cultivation techniques, such as aquaponics and aeroponics. We created a system consisting of several main components: 3 tanks with separate functions each and the aeroponics growth module. We have based the circularity of our system on the water cycle within it. It consists of three tanks: the first contains fishes (that were substituted by a nutrient solution for experimentation), that enrich the water with ammonia, then transformed into nitrates by the bacteria in the second tank. Then it’s sprayed into the aeroponic system, where the plants will be grown, and collected in the third tank. A UV light system ensures proper illumination of the plants as well as the sterilisation of the water before its return to the fish tank. Everything is controlled via sensors and actuators, which allow the system to function properly and provide constant data collection. This system allows plants to grow faster and healthier, without the use of harmful substances. In addition, our system would reduce water consumption by at least 85% compared to conventional systems.

**Awards Won:**