



# AIDWATCH: Automated Intelligent Driver and Watchdog for Autonomous Technologies Control and Health-monitoring

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# Context

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## Teleoperated robots

- UAV
- UGV
- USV
- ROV

## Autonomous robots

- AUV

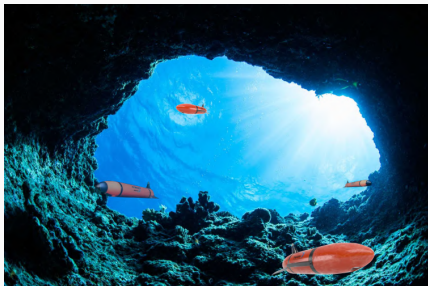
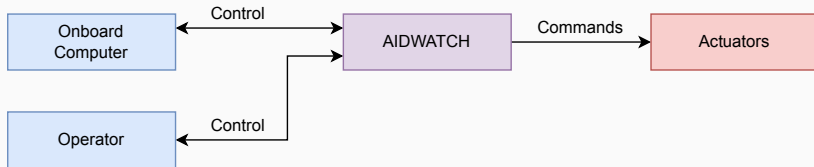


Figure 1: KarstX AUV



**Figure 2:** Hardware architecture

## Driver

- Generate actuators commands
- PWM, Boolean command, etc.

## Multiplexer

- Mix onboard computer and operator commands
- Give priority to operator commands

## Watchdog

- Include security checks
- Heartbeat
- Failsafe mode
- Emergency stop
- Programmable or configurable using RC

## Microprocessor

- Arduino
- ESP32

## Power regulators

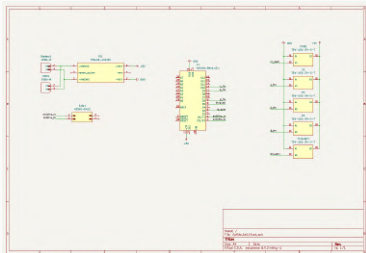
- One for actuators
- One for controller

## Input outputs

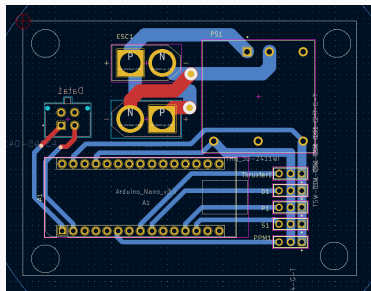
- Input plugs standard
- Male/Female convention for batteries
- Output plugs compatible with actuators

Feature	ESP32	Arduino
Operating Voltage	3.3V	5V
Digital I/O Pins	34	20 (Uno), 54 (Mega)
Analog Input Pins	12	6 (Uno), 16 (Mega)
Clock Speed	Up to 240 MHz	16 MHz
Flash Memory	448 KB to 520 KB	32 KB to 256 KB
SRAM	520 KB	2 KB to 8 KB
Connectivity	Wi-Fi, BLE, Ethernet	None (except Ethernet Shield)
Price	\$2 to \$10	\$10 to \$30
Power Consumption	Lower compared to Arduino boards	Higher compared to ESP32
PWM Pins	16	6 (Uno), 13 (Mega)
UART	2	1
I2C	2	1
SPI	2	1
ADC Resolution	12 bits	10 bits

**Table 1:** Comparison of ESP32 and Arduino Features

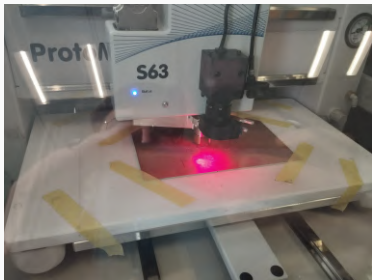


**Figure 3:** Kicad Schematics



**Figure 4:** Kicad PCB





**Figure 5:** Kicad Schematics



**Figure 6:** Mounted PCB

**Questions?**