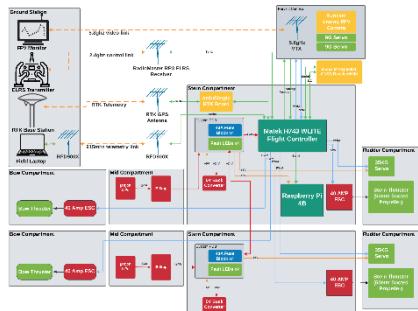
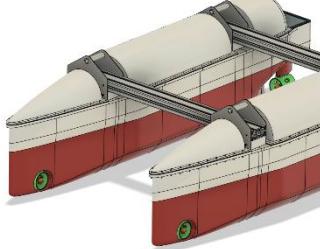


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3D Printed Autonomous Shallow Water Survey USV – CHEI/DroneLab



Specifications

- Design and construct low cost, rapidly manufacturable survey vehicle for shallow water operation
- Integrate highly maneuverable propulsion system with GPS based autonomous navigation
- Design robust electrical system with built in redundancies

Implementation

- >90% 3D printed construction utilizing acetone vapor fusing to join hull segments
- Waterproofing via hardware grade epoxy coating and gasket liner on hatch seals
- Propulsion via stern mounted, servo driven azimuth thrusters in addition to ducted bow thrusters
- Implemented autopilot via modified ArduRover firmware installed on H7 based flight controller
- Designed two independently powered power distribution PCBs located in each hull and are capable of transferring power between hulls

Long Endurance Fixed Wing Camera Platform – Yonder Dynamics



Specifications

- Design and construct a platform capable of minimum one-hour autonomous flight while carrying a mesh radio repeater for relaying to ground based vehicles
- Incorporate high resolution video capture/transmission system for identifying points of interest on ground

Implementation

- Selected MFE Believer airframe following literature review and logged flight data
- Installed Ubiquiti "Rocket" mesh radio in custom lightweight 3D printed antenna enclosure
- Video provided via 3 axis stabilized gimbal with telemetry overlay and broadcasted through high power analog video transmitter to antenna tracking ground station

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Offroad Solar Powered Bikepacking Ebike - Personal



Specifications

- Design a rugged ebike capable of efficiently traversing long distances offroad with 400lbs payload
- Integrate off grid solar charging capabilities that is usable while in motion
- Incorporate modular electrical enclosures with access panels for rapid field servicing

Implementation

- Frame based on “midtail” cargo bike modified with high torque middrive motor and regen braking capable rear hub motor
- Custom trailer carrying two 175w panels through MPPT solar charge controller into custom common port BMS equipped 52V li-ion battery
- Implement isolated high voltage/low voltage bus inside custom enclosures featuring weatherproof cable glands, fused ports, and modular connectors

PotatoDB Barcode Based Room Inventory System - Personal

Specifications

- Design SQLite-based inventory management system utilizing barcode scanning as primary user interface
- Develop dual-classification system supporting individual items and storage containers with recursive nesting capabilities

Implementation

- Construct SQLite database with “Items” and “Boxes” tables featuring parent child relations, unique identifiers, and modifiable metadata fields for item specific tracking
- Implemented end-to-end barcode processing including generation, storage, and printing via thermal sticker printer
- Deployed simplified web-based frontend as alternative interface for inputting object details and manipulating database structures