Developing Communications Boxes for KMR

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Overview

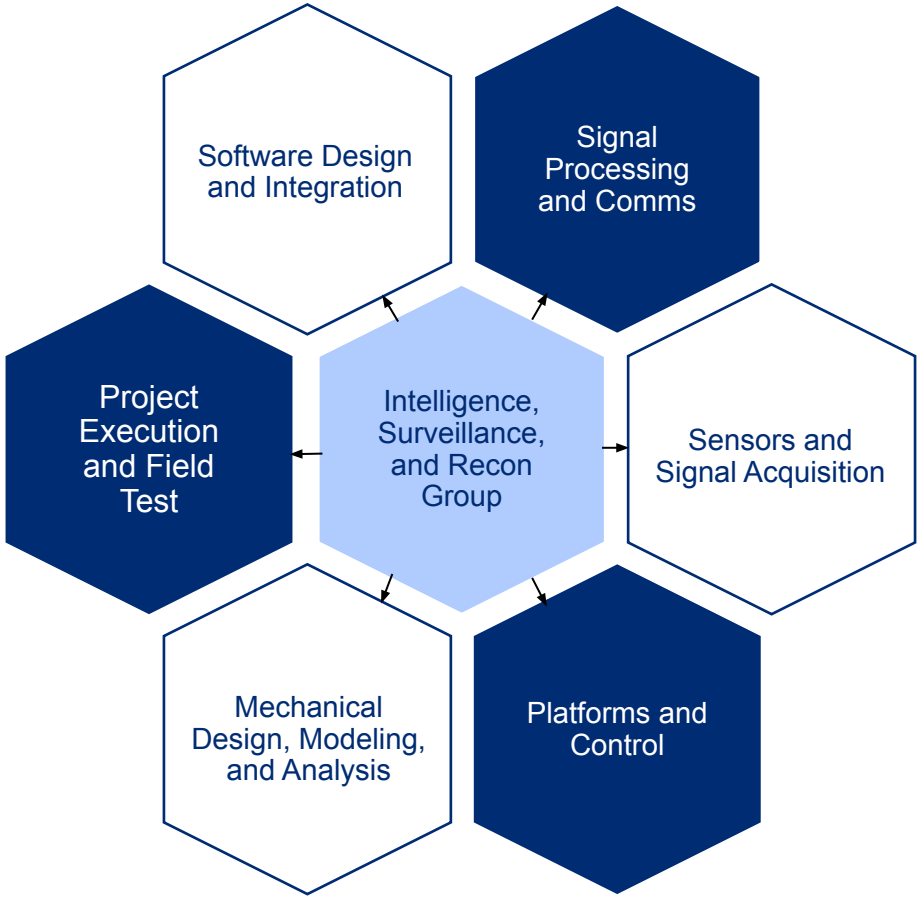
- About KMR
- Communications Box Projects
  - MISR
  - Deep Sea Lander IRAD

About KMR

Intelligence, Surveillance, and Reconnaissance Group

- Mission:
  - To provide comprehensive engineering expertise to rapidly develop and deploy solutions to mission critical, Intelligence, Surveillance and Reconnaissance (ISR) challenges for U.S. Government organizations.
  - To apply Quick Reaction Capability (QRC) to advanced concepts, sensor and system prototypes, field tests and evaluations, demonstrations, deployable systems, and post-deployment data analyses

- Expertise:
  - Rapid response, from concept development to deployment
  - Optical, acoustic, electro-magnetic, seismic, and other sensors and acquisition design
  - Persistent, autonomous, and wireless sensor systems for undersea, in-air, near space, or on-land environments
  - Sensor and system test and evaluation, operation analysis and operator training



Communications Box for MISR

MISR

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Stakeholders

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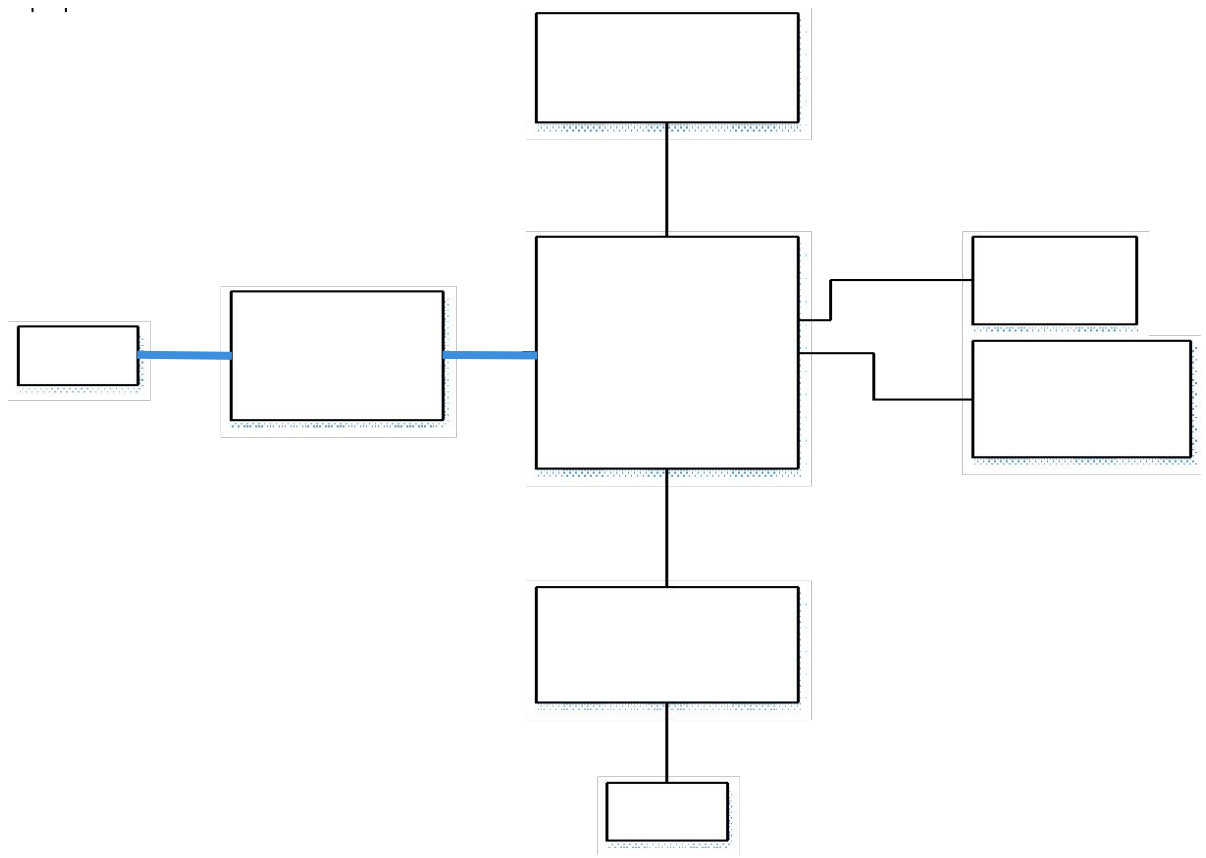
Objective

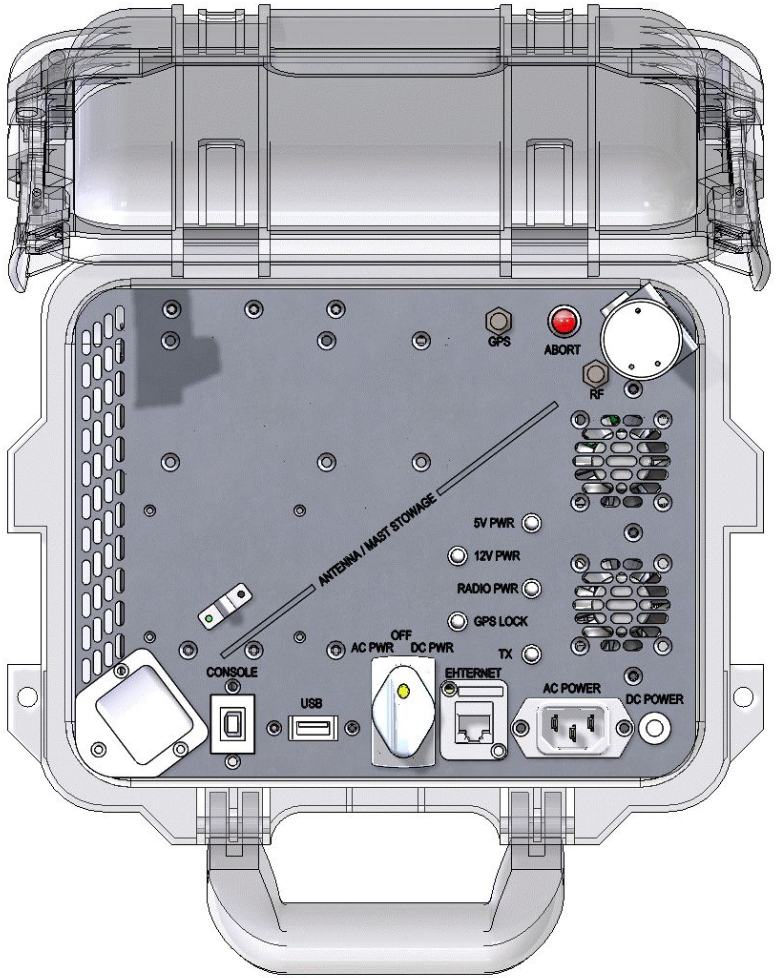
- Create a communications box that:
  - Allows data to be transmitted at certain modulations, frequencies, and time frames
  - Allows the user to configure these settings
  - Allows the user to access the box using their own computer
  - Takes in AC and DC power
  - Has accurate timing
  - Is compact and waterproof



General Architecture

Design

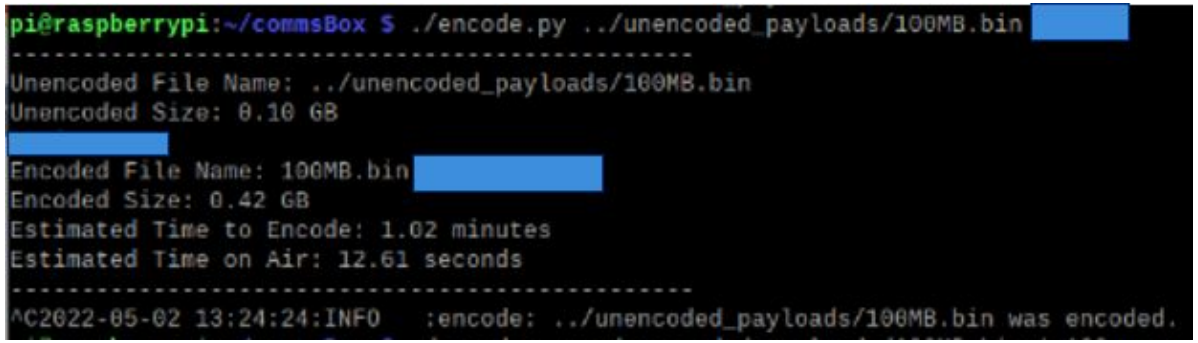
- Hardware Components
  - Based on Pi capabilities
  - Sourcing struggles
- Software
  - 5 core user programs
- Panel
  - Air flow
  - Aesthetic
- User Interaction
  - Logs
  - Countdown
  - Notifications
  - Box Connection
  - Manual



Final Box Cover Layout

Testing

- Hardware Components
  - Skeleton test box
  - Spectrum analyzer
- Software
  - Checking run times
  - Validating calculations
- User Interaction
  - Training coworkers
- Preliminary field tests



Successful Field Test Output

Future Development

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Communications Box for Deep Sea Lander IRAD

IRAD

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Stakeholders

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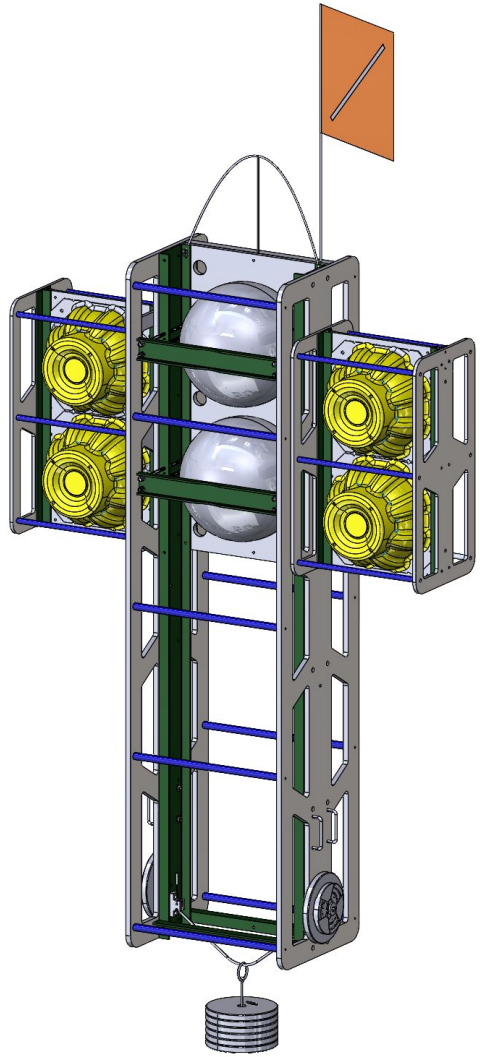
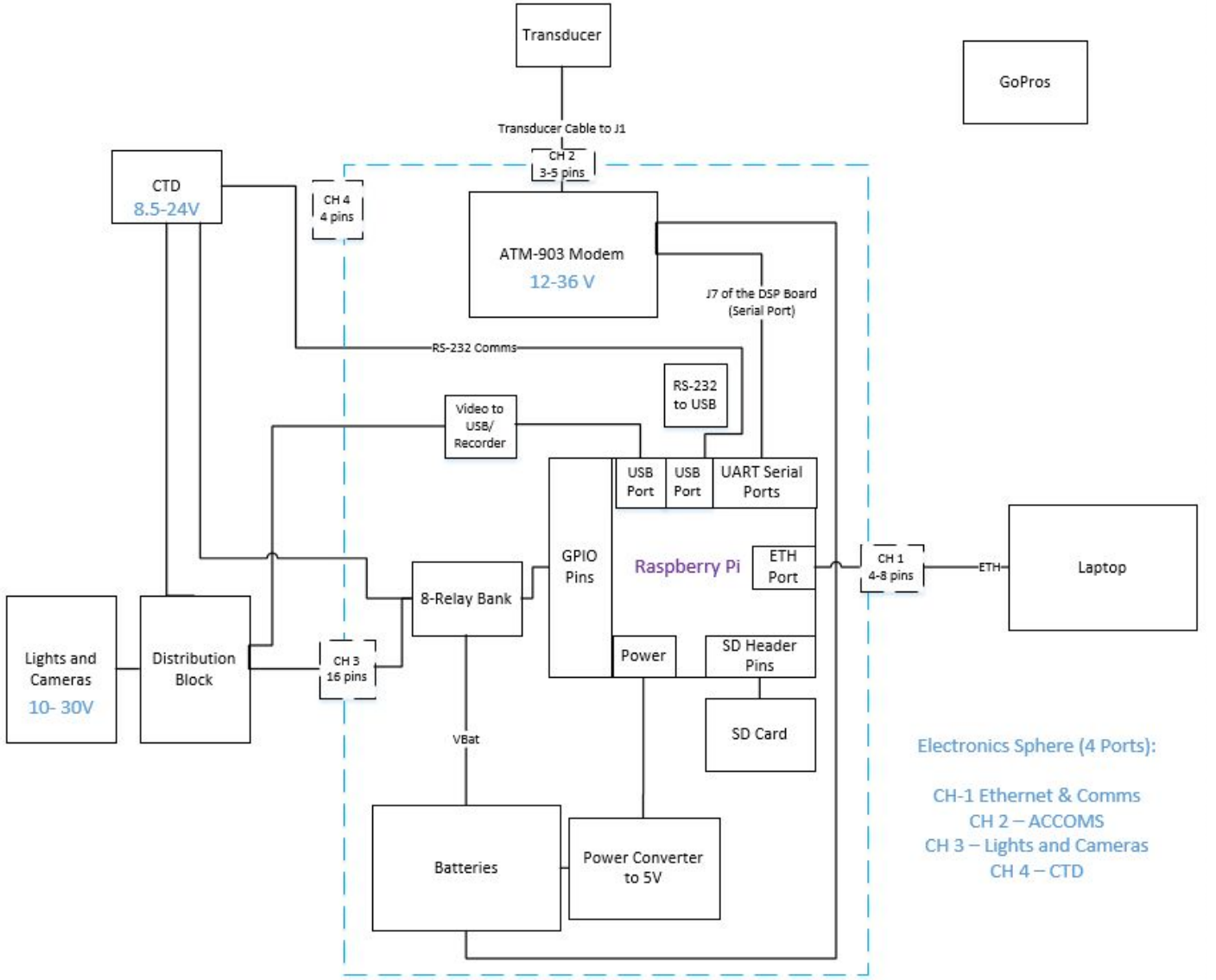
Objective

- Mission
  - To procure and outfit a deep water lander and progressively deploy it at multiple depths up to 6000 meters (deep water systems environment) to allow further exploration into the techniques, materials and technologies used in deep water design.

- Project Goal
  - To create a box that:
    - Controls peripheral sensors, lights, and cameras on lander
    - Interacts with acoustic modem to transmit and receives data underwater



Component Layout



Command Shell Interface

```
Hi, User!
Welcome to the Acoustic Comms Box Shell.
Type help or ? to list commands.

(user): help

Documented commands (type help <topic>):
========================================
exit  help  rx  status  time  tx

(user): time
2022-06-15 05:47:17.872339
(user):
```

- Currently, the processes of expanding the command shell and sourcing components are still in progress.

Future Development

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