MINDS-i DRONES CURRICULUM
Unmanned
Aerial
Vehicles

MINDS-i STEM INTEGRATED ROBOTICS: **UAV Mini DRONES LAB**

The MINDS-i Drone Curriculum is designed to teach students the complex systems of drone technology aligned with 21st century teaching standards. Designed as an interactive approach to applied learning, students will explore the fields of science, technology, engineering, and math. Students will become familiar with the basics of drone systems, robotics, and programming in a team based environment.

STEM as a System

MINDS-i's robotics education platform is simple to use, extraordinarily durable, and infinitely modifiable. The high-technology platform and curriculum will prepare students with the skills they need to excel in the 21st century.

Continuous Learning and Improvement

Inspire a rigorous college and career relevant experience by teaching STEM education through drones.

Course Design

Each lab is designed for three to five students including a half semester (**45 Hours**) of lesson plans and materials. Foundations is the recommended prerequisite to the MINDS-i Drone Curriculum.
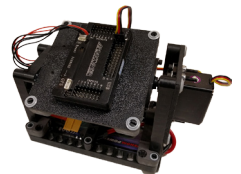
| GPS & Compass | Telemetry | Dashboard | Drone Module | RC Control | Flight Simulator | Gimbal Kit |

MINDS-i

MCK-UALB-MR2

Unit 1: Introduction to MINDS-i
- 1.1 Introduction to MINDS-i
- 1.2 Student Performance Development Process
- 1.3 What is a Drone?

Unit 2: Drone Code & Sensors
- 2.1 Testing the Micro-Controller
- 2.2 Parts & Purposes
- 2.3 Drone Technologies Part 1
  - Gyro & Accelerometer
- 2.4 Drone Technologies Part 2

Unit 3: UAV Flight Principles
- 3.1 Physics of Flight
- 3.2 UAV Build
- 3.3 Flight Dynamics
- 3.4 Autopilot & PID Tuning
- 3.5 Simulated Flight
- 3.6 Manual Flight
- 3.7 FAA Pilot Certification

Unit 4: Applied Systems Thinking
- 4.1 Systems Thinking
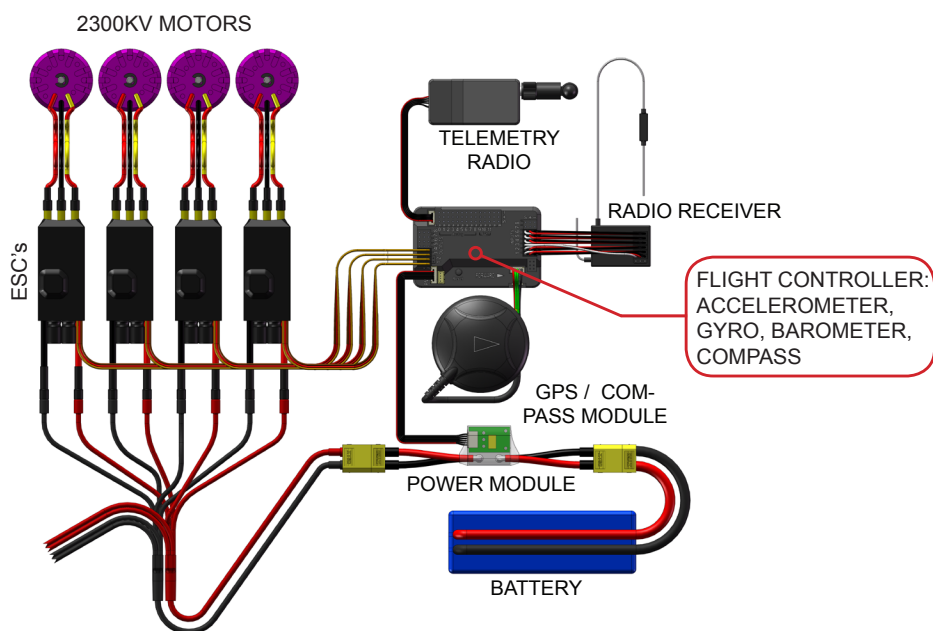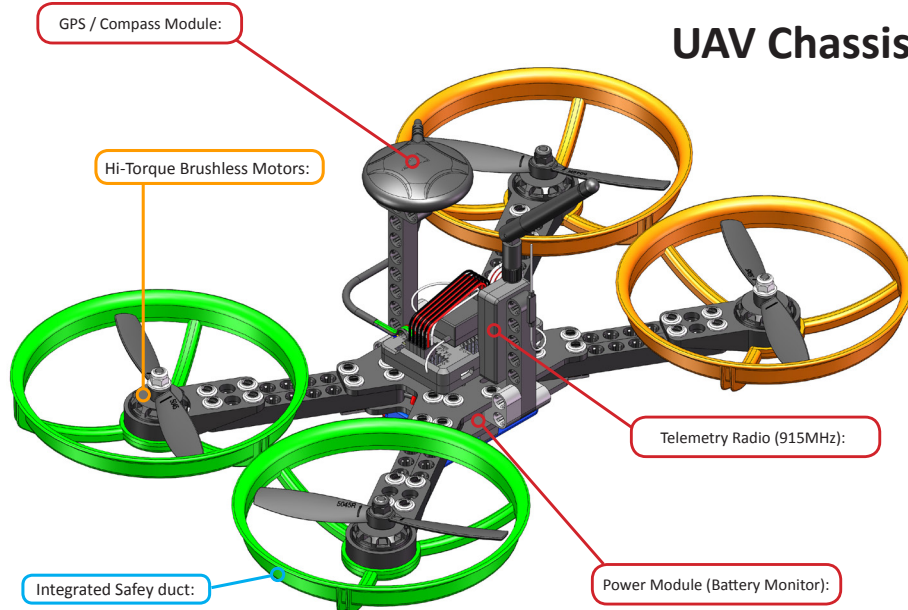- 4.2 Interrelationship Diagram

Unit 5: Culminating Project
- 5.1 Preparing for the Challenge
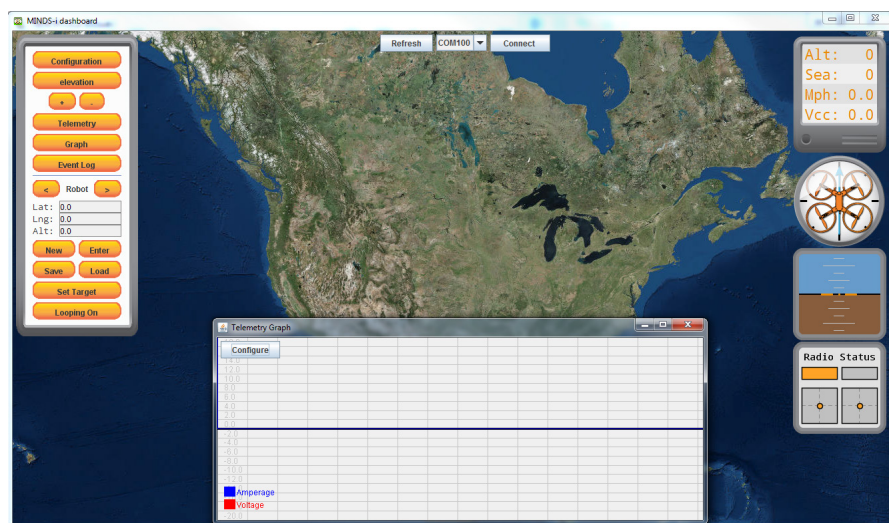- 5.2 Cleanup / Organization

STEM Integrated Robotics UAV Drones covers a multitude of engineering concepts including
- Programming
- Physics
- Mechanical Systems
- Electrical and Electronic Systems
- Hands on Activities and Capstone Projects in each Semester

UAV Chassis

GPS / Compass Module:

Hi-Torque Brushless Motors:

Telemetry Radio (915MHz):

Integrated Safey duct:

Power Module (Battery Monitor):

2300KV MOTORS

ESC's

TELEMETRY RADIO

RADIO RECEIVER

FLIGHT CONTROLLER: ACCELEROMETER, GYRO, BAROMETER, COMPASS

GPS / COMPASS MODULE

POWER MODULE

BATTERY

MINDS-i Dashboard Software & Mega 2560 Hardware

- Open Source Software
- Easy to use Graphical Interface
- Drag and Drop Installation (w/Radio Driver)
- Save and Load GPS Paths
- Live Location Tracking
- Wirelessly Adjust Settings
- Capable of Navigating to 100 Waypoints
- Customizable Graphs
  - Latitude, longitude, Yaw/Direction, Pitch, Roll, Ground Speed, Voltage, Amperage and Altitude
- Full Telemetry Logging
- Inclinometer Gauges
- Windows 10, OS X & Linux Ready