SELF-DRIVING TRACTOR

Autonomous Self-Driving Farming

MCK-AFTR-BLU MCK-AFTR-RED MCK-AFTR-ORN MCK-AFTR-GRN

MINDS-i STEM INTEGRATED ROBOTICS: AUTONOMOUS SELF-DRIVING FARMING

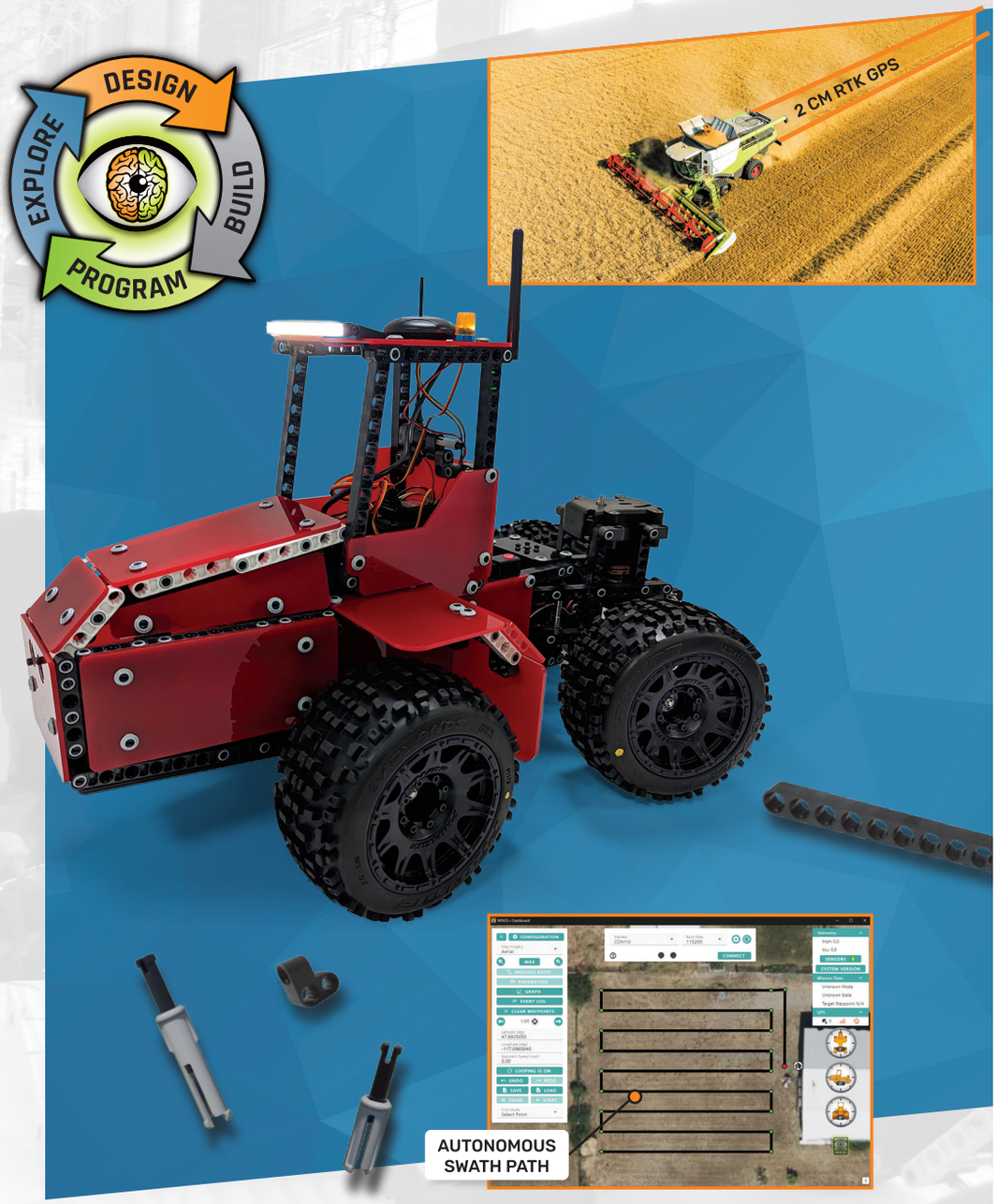
Take STEM to new heights with this cutting-edge GPS-enabled, self-driving tractor. Students explore electromechanical systems and programming of autonomous operations. Students design, build, and program the tractor for ground-based crop evaluation, spraying, spreading, crop monitoring and other modern agricultural challenges.

RTK-GPS 2CM PRECISION

Enables the tractor to hold 2cm of self-driving repeatability for precision farming.

COURSE DESIGN

This lab is a half semester (45 Hours) and designed for 2-4 students.








GPS & COMPASS | BRUSHLESS MOTOR | ENCODER | DASHBOARD | CONTROLLER | RC CONTROL

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SELF-DRIVING TRACTOR SPRAYER AND RTK STATION

RTK Base Station - MCK-BSST-RTK Sprayer Trailer - MCK-AFST-001

CURRICULUM OUTLINE - 45 HOURS

Unit 1: Introduction to Autonomous Vehicles

1. Student Performance
2. What is an Autonomous Vehicle

Unit 2: Autonomous Self-Driving Tractor

1. Self-Driving Tractors; Levels of Autonomy
2. Self-Driving Tractors; Current and Future Use Cases

Unit 3: Autonomous Tractor Technologies

1. Self-Driving Tractors; Localization
   a. GPS Navigation
   b. Inertial Measurement Unit (Gyro, Accelerometer, Compass)
   c. Encoder (Cruise Control)
   d. Localization (Cross-Track Error)
2. Self-Driving Tractors; Communication
   a. Control Systems
   b. Object Detection & Avoidance

Unit 4: Electrical Engineering & Energy Transfer

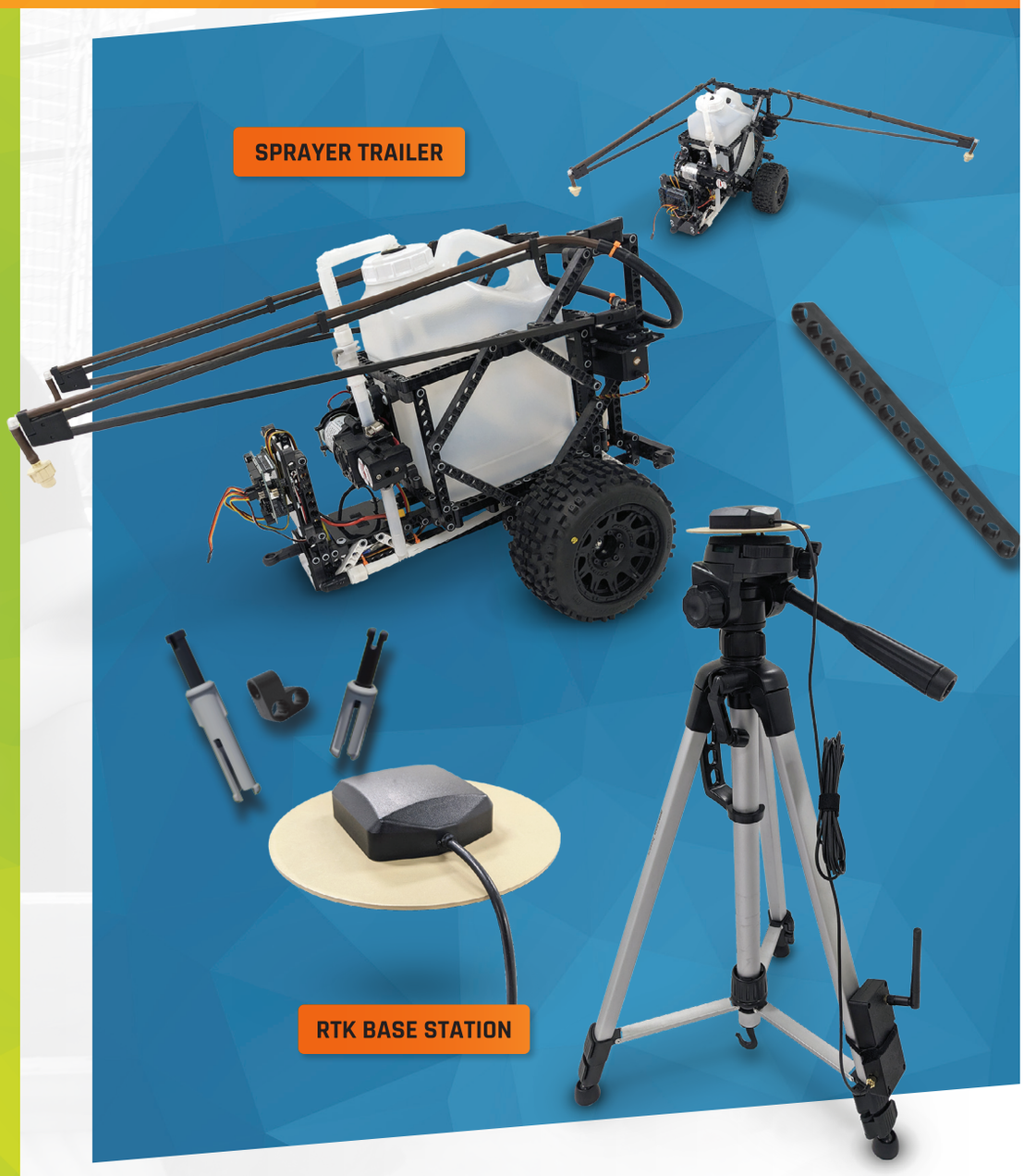
1. Energy Types & Transfer
2. Electric Motors
   a. How They Work & Benefits
3. Batteries
   a. Usage, Maintenance, Technologies

Unit 5: Applied Systems Thinking

1. Inputs, Outputs and Constraints
2. Interrelationship Diagrams

Unit 6: Culminating Projects; Automated Farming

1. Ground Prep
2. Planting
3. Fertilizing
4. Watering
5. Harvesting



SPRAYER TRAILER

- One (1) gallon capacity tank
- Quick disconnect tank for easy refills
- One (1) gallon per minute pump
- Includes 2 sets of nozzles, one set of fan spray and one set of misters
- Arduino microcontroller for automatically opening arms/spraying
- Adjustable pump rate

RTK BASE STATION

- Provides 2cm Precision Corrected GPS Data
- Dual Band (L1/L5) GPS Antenna
- GNSS-RTK (L1/L5) Module
- USB-C for Power & Configuration
- Adjustable tripod with quick connect mount for easy setup