



# Position estimation and tip-over prevention system for off-road vehicles

Technology No. 2020-160

**IP Status:** Provisional Patent Application Filed; **Application #:** 62/949,687

## Applications

- Construction vehicles, agricultural machineries and other off-road vehicles

## Position estimation and tip-over prevention system

Researchers at the University of Minnesota have developed an IMU-based end effector position estimation system for agricultural vehicles, construction vehicles and other off-road vehicle systems. The system comprises multiple inertial measurement units (IMUs) that measure linear or angular position and an algorithm that analyzes data and predicts possible events. The system estimates the position of the end-effector and in addition can help detect if a vehicle tip-over is likely to occur, so that such a tip-over event can be prevented. The system uses inexpensive (up to 10x cheaper than existing systems), off-the-shelf sensors that can be easily implemented in vehicles.

## Phase of Development

**TRL: 3-4**

Sensors system tested. Algorithm is under development.

### Researchers

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