# MAVS

Mississippi State University
Autonomous Vehicle Simulator

## What is MAVS?

MAVS enables the simulation of **off-road**, **autonomous** ground vehicles. The MAVS software library provides the ability to evaluate the performance of autonomous **perception and navigation** software in real-time. MAVS supports **high-performance computing**, enabling thousands of concurrent simulated experiments. MAVS provides **physics-based** sensor simulation of LIDAR, GPS, cameras and other sensors as well as vehicle models for **off-road terrain**.

## Why use MAVS?

**Off-road activity**
MAVS uses validated models for tire-soil interaction in sand and clay and lidar-vegetation interactions

**Optimized for large-scale HPC simulation**
MAVS automatically generates new off-road terrains and natively runs on all flavors of Unix/Linux, as well as Windows

**Ease of Use**
MAVS can be installed in less than 5 minutes and has interfaces to Python and ROS

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## Features

- Automated terrain generation
- Simulated environmental conditions like rain, snow, dust, fog, and time of day
- User-friendly Python API
- ROS interoperability
- Cross-platform, C++ source code
- Validated vehicle-terrain interaction modeling
- Large database of vehicles, terrains, and sensors



## Applications

- Generating data sets for training and evaluating AI/ML perception algorithms
- Developing negative obstacle detection algorithms
- Studying and contrasting path-planning algorithms for autonomous navigation
- Safely testing autonomy algorithms before physical tests
- Teaching aid in autonomous perception course
- Supporting research for multiple theses, dissertations, and over 30 academic publications



## Users



MAVS users are a large and growing community of researchers, including:

- Academic users at over a dozen universities
- International users in Africa and Asia
- US Federal Government users in Department of Energy, Department of Commerce, and Department of Defense
- Commercial users in a variety of industries

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## For information on licensing:

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