



OVERVIEW



navX2-Micro is a second-generation 9-axis sensor (3-axis accelerometers, gyroscopes and magnetometers) featuring sophisticated data fusion, motion processing and sensor calibration algorithms. Key specifications include:

- High-accuracy attitude (yaw/pitch/roll), with *minimal yaw drift of less than ~1 degree/minute*
- 5-second startup time
- Tilt-corrected compass heading with magnetic disturbance detection
- 9-axis heading combining pose and magnetically-valid compass heading

Even in electro-magnetically challenging environments, the 9-axis heading's combination of "pose" and magnetically-valid compass heading data (e.g., before motors are energized, or when the robot is at rest) enable tracking of a robot's absolute heading.

FEATURES



- **Plug-n-play install via USB**
- **High-Quality Sensor Calibration**
- **Libraries & sample code for easy use on FIRST FTC & FRC robots**
- **Enclosure and design files for 3d-printed enclosure available**
- **navX-Micro Aero: adds a barometric pressure sensor for altitude measures**



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navX2-Micro Robotics Navigation Sensor

BENEFITS



Supercharge your robot with:

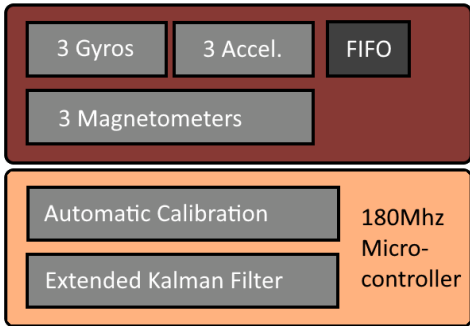
- **Field-oriented drive**
- **Auto-balancing**
- **Auto-rotate-to-angle**
- **Motion/no-motion detection**
- **Collision Detection**
- **and more...**

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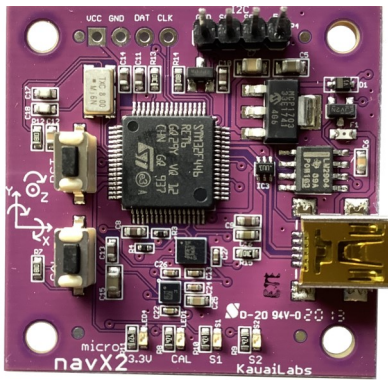


CUTTING-EDGE TECHNOLOGY



- **STMicro LSM6DSM IMU**
- **STMicro LIS2MDL Magnetometer**
- **180MHz Microcontroller**
- **416Hz Extended Kalman Filtering**

EASY-TO-USE DESIGN



navX2-Micro circuit board



USB 2.0 compliant interface

Technical Specifications

Key Components

COMPONENT	DESCRIPTION	MODEL	CAPABILITIES
Microcontroller	180Mhz 32-bit ARM Cortex-M4 w/FPU	ST Microelectronics STM32F446	Data acquisition, calibration and sensor fusion
Inertial / Magnetic Sensors	6-Axis Accel/Gyro sensor 3-Axis Magnetometer	ST Micro LSM6DSM, LIS2MDL	High-quality acceleration, rotation rate and heading measures
Altimeter (navX-Micro Aero only)	High-resolution barometric pressure w/24-bit Delta-Sigma ADC	Measurement Specialties MS5611	High-quality relative altitude measures with 10cm resolution

Communication/Power Interfaces

TYPE	MAXIMUM SPEED	CAPABILITIES
USB	12 Mb/s	Communication with navX-Micro when I2C connector not used
I2C	400Khz	4-pin connector enabling simple connection over dedicated cabling

Key Features

FEATURE	DESCRIPTION	BENEFIT
Sophisticated, High-accuracy Sensor Fusion	Extended real-time Kalman Filter running at 416Khz	High-accuracy orientation measures even during high-G events, using state-of-the-art algorithms
Automatic Accelerometer and Gyro Calibration	Self-calibration algorithms; storage of calibration coefficients in flash memory; continuous recalibration during operation	High-accuracy yaw, pitch and roll measures with no calibration effort required.
Magnetometer Calibration Tools and Anomaly Detection	Support and tools for in-situ hard and soft-iron magnetometer calibration, and auto-detection of magnetic anomalies	High-accuracy compass heading measures with a simple calibration process.
Configurable Update Rate	From 4-200 Hz	Allows tradeoff between application load and latency
Tilt-compensated Compass Heading	Compass heading correction based upon tip/tilt measures	Heading accuracy independent of sensor "pose"



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