### UAV Sensors

#### Topics
- UAV Sensors

#### References
**UAV Sensors Introduction**

- **Sensors**
  - For the mission
  - For autonomy
- **Cameras**
  - Electro-optical
  - Infrared
  - Thermal imaging
- **Compass**
- **Gyroscope**
- **Global Positioning System (GPS)**
- **Differential Global Positioning System (DGPS)**

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**UAV Sensors Introduction**

- **Synthetic Aperture Radar (SAR)**
  - Images using multiple radar images
  - A moving antenna
  - Multiple stationary antennas
- **Millimeter Wave Radar (MMW)**
  - Collision detection (ground and air)
  - Extremely high frequency
  - Wavelength of millimeters
UAV Sensors
Introduction

- Altimeter
- Proximity sensors
  - Landing
  - Other obstacles
- Communication modules
  - Wireless Ethernet
  - RF transmission
  - Link with the ground (manual control)
- RPM sensor for rotors

UAV Sensors
Introduction

- Inertial measurement unit (IMU)
- Measures
  - Velocity
  - Orientation
  - Gravitational forces
- Uses
  - Accelerometers
  - Gyroscopes
- Detects changes in
  - Roll
  - Pitch
  - Yaw
UAV Sensors
Introduction

- Health sensors
  - E.g., temperature
  - E.g., battery
- Pitot tubes
  - Airspeed indicator
  - Pressure used to determine velocity
  - Maintaining airspeeds specific to aircraft and conditions
  - Issues with ice and insect nests

UAV Sensors
Introduction

- Science sensors
  - Temperature
  - Humidity
  - Pressure
  - Wind speed
  - Chemical agents
  - Pollution levels
  - Acoustic sensor
UAV Sensors
Introduction