Robot Dog GO2

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Introduction

Welcome.

In this video we will look at an overview of the GO2 quadruped robot and how it is used in surveying, inspection, and data acquisition activities integrated with the EagleArca platform.

The GO2 is a mobile robot designed to operate in complex environments or situations that may be potentially dangerous for human operators. Thanks to the combination of advanced mobility, integrated sensors, and real-time communication systems, the robot can explore an environment, collect data, and transmit it directly to the digital platform that manages the operations.

Throughout this video we will see how the robot is structured, which sensors it uses to perceive the surrounding environment, how communication with the platform takes place, and how operational missions can be planned through the Mission Planner features of EagleArca, which allow users to define routes, actions, and data acquisition activities.

We will also see how the robot can be equipped with additional tools to adapt to different operational scenarios, and we will conclude with some practical guidelines for system maintenance and management.

Structure and Mobility

The GO2 is a quadruped robot, meaning a robotic platform that moves using four articulated limbs similar to the legs of an animal. This type of architecture provides much greater mobility than wheeled or tracked robots, because it allows the system to handle uneven surfaces, overcome small obstacles, and maintain stability even on complex terrain.

The robot’s structure is designed to be both lightweight and durable. The frame uses high-strength metal materials that keep the overall weight relatively low while maintaining the robustness required for operation in demanding environments.

Each leg of the robot is composed of multiple motorized joints that allow the system to continuously adapt its posture and gait depending on the surface it moves across. These joints form the robot's degrees of freedom, meaning the directions in which the robot can move its limbs.

Thanks to this system, the GO2 can walk, climb small steps, move across irregular terrain, and maintain balance even while in motion. The motion control systems constantly work to stabilize the robot and adjust its posture whenever the terrain changes suddenly.

These characteristics make the robot particularly suitable for inspection activities in industrial environments, infrastructures, construction sites, or natural areas where human access may be difficult or risky.

Integrated Sensors

In order to orient itself in space and collect useful information during a mission, the robot is equipped with several integrated sensors that allow it to perceive the surrounding environment.

Among the main ones are RGB cameras, which capture color images in the visible spectrum, similar to those used in standard digital photography systems. These cameras allow the robot to visually document the environment and acquire images useful for inspection and monitoring activities.

Alongside RGB cameras there are often depth cameras, which are sensors capable not only of capturing an image but also estimating the distance of objects within the scene. This makes it possible to reconstruct the geometry of the surrounding environment.

Another fundamental sensor is LiDAR, which stands for Light Detection and Ranging. LiDAR is a scanning system that uses laser pulses to measure the distance between the sensor and surrounding objects. By analyzing the time it takes for the laser beam to return, the system can calculate distances with high precision and generate a three-dimensional representation of the environment.

The robot also integrates an IMU, or Inertial Measurement Unit. This sensor detects accelerations, rotations, and inclinations of the robot, allowing the control system to maintain balance and stability during movement.

In some configurations, GPS or RTK positioning systems may also be present. GPS allows the robot to determine its position on the Earth's surface, while RTK (Real-Time Kinematic) technology significantly improves positioning accuracy, reaching centimeter-level precision.

All these sensors work together to allow the robot to understand the surrounding environment, avoid obstacles, and move safely during operations.

Communication and Network

During operations, the robot must be able to continuously communicate with control and supervision systems.

For this reason, the GO2 uses several network communication systems, including Wi-Fi and cellular connectivity, allowing the robot to transmit data and receive commands in real time.

Through these connections, the robot can send sensor information, camera images, and telemetry data to the platform. Telemetry refers to the set of data that describes the operational state of the system, such as position, speed, battery level, and sensor status.

When the robot is connected to the EagleArca platform, this data is visualized and managed within the operational environment. Operators can therefore monitor the mission status, observe the collected data, and intervene if necessary.

This continuous connection transforms the robot from a simple mobile device into an integrated component of a broader digital system, where data acquisition, monitoring, and analysis all take place within the same platform.

Add-ons and Payload

One of the most interesting aspects of the GO2 is the possibility of installing modular add-ons.

The term add-on refers to any additional tool or sensor installed on the robot to perform a specific operational task. The payload represents the maximum useful load that the robot can carry.

Among the most common add-ons are high-resolution cameras for visual documentation, three-dimensional LiDAR scanners for environmental mapping, and multispectral sensors used for environmental or agricultural analysis.

A multispectral sensor is a particular type of sensor capable of capturing images in multiple bands of the electromagnetic spectrum, not only within the visible range. This allows the analysis of environmental characteristics that would not be visible with a standard camera.

When the robot is used together with EagleArca, the robot’s hardware configuration is registered within the platform. The Mission Planner features allow users to define the Mission Unit, meaning the specific robot used for the mission, and the add-ons installed on it.

This step is important because it allows the platform to know which instruments are available during the mission and therefore which operations can be performed along the route.

Control and Navigation

The robot can be controlled either in manual mode or in autonomous mode.

Manual control can be performed using the robot’s dedicated controller or directly through the EagleArca platform. When the robot is executing an automatic mission planned within the platform, the operator can suspend the automatic execution at any time and take manual control of the robot through the EagleArca interface.

Autonomous mode, on the other hand, derives from mission planning using the Mission Planner features.

Within the platform it is possible to draw on the map the route that the robot must follow. This route is defined through a sequence of waypoints, which are geographic points representing the stages of the robot’s movement.

Each waypoint can include one or more operational actions, such as capturing images, starting a scan, or executing a pause.

Once the mission is configured, the platform performs a preliminary verification called Mission Pre-Check, which verifies the availability of the robot, configured sensors, and the parameters required for mission execution.

After this verification the mission can be launched, and the robot will autonomously follow the defined route.

Data Acquisition

During mission execution the robot performs data acquisition activities along the defined route.

Acquisition operations are configured during mission planning. At each waypoint it is possible to define specific actions that the robot must perform, such as taking photos, recording video, or starting a scan with the installed sensors.

This allows the creation of operational missions in which the robot does not simply move through space but performs a sequence of data collection activities.

The data acquired during the mission is transmitted and stored within the EagleArca platform. Each executed mission is saved in the system history, allowing users to review the results, compare acquisitions over time, or repeat the same mission with identical configurations.

In this way the robot becomes part of a digital workflow that integrates data acquisition, storage, and analysis.

Maintenance and Best Practices

To ensure reliable operations it is important to follow some best practices in managing the robot.

One of the most important aspects is battery management. The GO2 uses a dedicated battery with an integrated management system that automatically controls charging and discharging operations and protects the system from overvoltage or electrical anomalies.

The battery level can be checked using the LED indicators located on the battery itself. These indicators show the remaining charge percentage and help determine when the system needs to be recharged.

Charging must be performed using the dedicated charger provided by the manufacturer. Before connecting the charger, it is necessary to ensure that the battery is turned off and disconnected from the robot. During charging, the LED indicators show the status of the process until the battery is fully charged.

During operation it is also important to pay attention to the status lights on the robot, which communicate the operational state of the system. A green light generally indicates that the robot is powered on and operational, while other color combinations or flashing signals may indicate specific modes, sensor calibration, low battery, or possible system anomalies.

Before starting a mission it is also recommended to verify the sensor status, network connection, and mission configuration within the platform.

Another important aspect concerns firmware updates, which are updates to the internal software that manages the robot’s operation. Keeping the firmware updated helps improve stability, security, and system performance.

By following these procedures it is possible to ensure safer operations and greater reliability of the robot during surveying and monitoring activities.

Conclusion

In this video we have seen an overview of the GO2 quadruped robot and its main operational characteristics.

We examined the robot’s structure and locomotion system, the sensors that allow it to perceive the surrounding environment, and the communication systems that enable the transmission of data and information in real time.

We also saw how the robot can be equipped with different add-ons to adapt to various operational scenarios, and how the Mission Planner features within EagleArca allow users to plan missions, define routes, and manage data acquisition activities directly from the platform.

Thanks to the combination of advanced mobility, sensor technology, and software integration, the GO2 represents a versatile tool for surveying, monitoring, and inspection activities in complex environments.

Integration with EagleArca also allows robotic operations to become part of a complete digital workflow, where mission planning, data acquisition, and information analysis are all managed within the same system.

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