FLYCART 30 Redundant Systems Report

The DJI FlyCart 30 platform is designed with extensive system and sensor redundancies to maximize flight safety and reliability. These redundancies and safety mechanisms include: flight control system sensors, the propulsion system, dual intelligent flight batteries, image transmission links, and dual remote controllers.

1. Flight Control Sensor Redundancy

Dual Inertial Measurement Units

An inertial measurement unit (IMU) measures the aircraft's real-time three-axis acceleration and angular velocity and helps calculate the aircraft's velocity, position, and attitude angle. DJI FlyCart 30's dual IMU redundancy design ensures stable performance and high reliability. This feature works with fault diagnosis and redundancy switching algorithms, allowing the drone to switch from the primary IMU to the backup IMU within 200 milliseconds if the primary IMU fails. This enhances the flight stability of the drone.

Dual Barometers

A barometer determines relative altitude based on atmospheric pressure and provides precise altitude readings for the aircraft. DJI FlyCart 30's dual barometer redundancy design allows the drone to switch from the primary barometer to the backup barometer if the primary barometer fails. This also improves the flight stability and reliability of the drone.

RTK Antenna Redundancy

The Real-Time Kinematic (RTK) system provides positioning data for the drone to achieve stable and precise hovering and route flights in all weather conditions. It outputs centimeter-level latitude and longitude information, altitudes, and other location information, enabling high-precision flights. In addition, RTK provides precise heading directions for the drone. The RTK and the dual compasses act as backups to each other, greatly enhancing the flight safety and stability of the drone in complex electromagnetic environments. DJI FlyCart 30 supports various satellite positioning systems, including GPS, GLONASS, BeiDou, and Galileo. The dual redundant RTK antennas provide global positioning for the drone in all weathers.

Radar+Binocular Sensing Redundancy

DJI FlyCart 30 adopts front and rear rotating active phased array radar systems and two binocular vision systems to detect the environment and location in real-time, allowing the drone to bypass obstacles effectively in complex environments. If the forward radar sensor fails, the vision sensor will continue to function, providing multi-directional, all-weather, and 24/7 obstacle sensing and bypassing capabilities to make your flights safer.

2.Power System Redundancy

Motor Redundancy

The propulsion system is equipped with a 4-axis coaxial design. If one motor fails, the other seven continue operating, enabling DJI FlyCart 30 to land safely. During landing, you can maintain essential flight control, including control over the altitude and horizontal movements, and select a safe landing point as needed.

Dual Signal Link Backup for the Throttle

The throttle signal link from the flight control system to the power system is connected to both pulse width modulation (PWM) signals and Bus 485, which serve as redundancy to each other. This redundancy design guarantees safe and stable transmission of throttle signals between the flight control and power systems.

3. Dual Intelligent Flight Battery Backup

DJI FlyCart 30 can be powered by two batteries. They ensure that even if there are issues with one battery during flight, the other one can help the aircraft return and land safely.

4. Image Transmission Link Backup

DJI FlyCart 30 adopts a 4-antenna redundancy design, with each single antenna being capable of providing the aircraft with transmission services. However, some performance loss may occur in areas not covered by a specific antenna. The drone supports two frequency bands, ranging from 2.400 GHz to 2.4835 GHz and from 5.725 GHz to 5.850 GHz. If signals in one frequency band cause interference, the drone can automatically switch to the other frequency band. In addition, DJI FlyCart 30 allows the SDR image transmission system and the 4G enhanced image transmission system to operate concurrently, providing redundancy to maximize flight safety.

5. Dual Remote Controller Mode

DJI FlyCart 30 supports the Dual Operator mode. In large-range or complex operating scenarios, if the communication between one remote controller and the drone is interrupted, the other remote controller can take complete control of the drone. This feature ensures uninterrupted, safe operations and flights.

6. Additional System Designs to Maximize Safety and Reliability

Parachute

When critical failure occurs and causes the drone to drop dramatically, DJI FlyCart 30 allows you to manually or automatically deploy the parachute, minimizing the damage to people and property. Note that the parachute of DJI FlyCart 30 can be deployed at a minimum altitude of 60 meters, and the drone and its payload may be damaged after the parachute touches the ground.

ADS-B

DJI FlyCart 30 is equipped with DJI AirSense, a technology that enhances airspace safety by providing the operator with real-time information about airplanes and helicopters within 15 km, including their position, altitude, heading, and velocity. The risk of a close encounter with another aircraft is sent to the pilot in real-time in the DJI Pilot app, so informed decisions can be made quickly to ensure safety.

This manual is subject to change without notice.

You can check the latest version on the official website of DJI at https://www.dji.com/cn/flycart-30.

If you have any questions or suggestions for the manual, please contact us via **DocSupport@dji.com**