



# **ASSESSING PAYLOAD**

## **FOR DJI RONIN CAMERA STABILIZERS**

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A key parameter for camera stabilizers is the weight of the camera and lens, otherwise known as the payload. A stabilizer's rated payload alone can roughly indicate the overall performance of the product.

Rated payload is subject to multiple factors and has complex evaluation criteria. This article will elaborate on DJI's definition of payload.

## 1. DEFINITION

Rated payload refers to the weight of the load on a gimbal's three axes motors while maintaining balance, making the motors run stably to ensure smooth footage as a result.

## 2. THE EFFECT OF PAYLOAD ON A STABILIZER

The rated payload of a gimbal should reflect actual use with functional cameras and lenses, rather than ideal, controlled situations with simulated weights. The size of this figure is heavily influenced by the gimbal's structural design and algorithm's optimization; therefore, the rated payload is a reliable indicator of a camera's design quality and overall performance.

A stabilizer that supports higher payloads during actual use is beneficial in many ways:

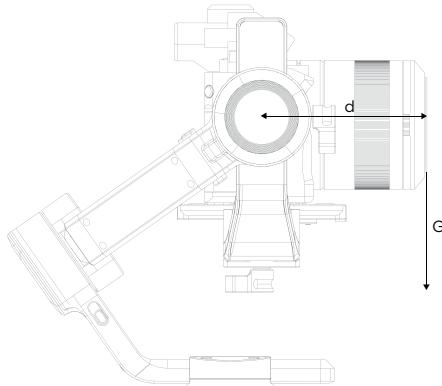
- Wider equipment selection: The stabilizer supports longer, heavier lenses and cameras, as well as other accessories such as microphones.
- Increased tolerance to disturbance: The stabilizer is effective in scenes with more dynamic demands, such as when mounted to a moving vehicle.
- Consistent image stabilization: The stabilizer provides the same reliable stabilization for all mounted equipment within the payload range.

## 3. FACTORS AFFECTING THE PAYLOAD

### LOCATION OF THE CENTER OF GRAVITY

The actual load of the 3-axis gimbal must take into account the center of gravity of the mounted equipment. For the same weight, the farther the center of gravity from the motor, the greater the stress of the load. When shooting with longer lenses, the motors may become weaker, preventing its ability to

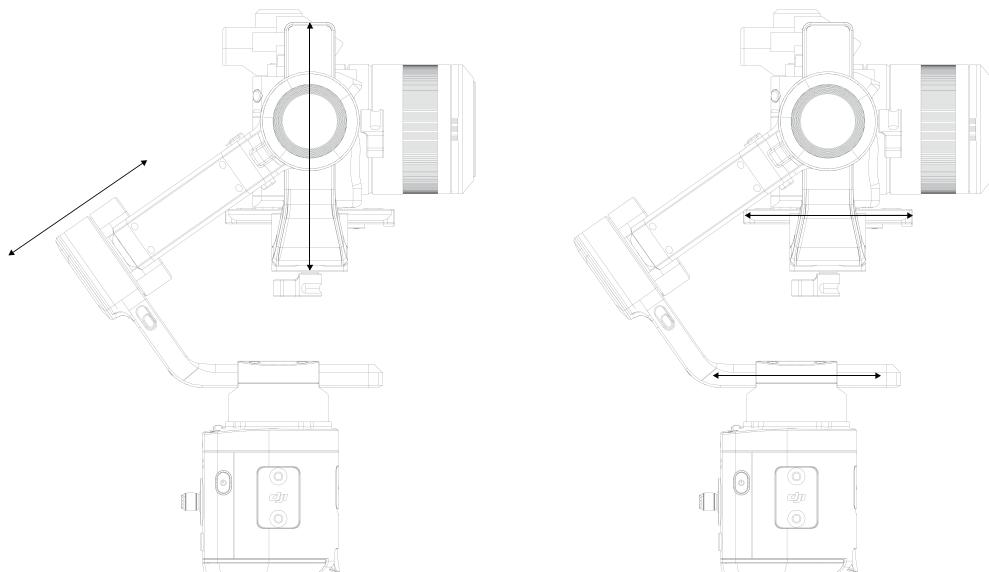
carry the load effectively or operate normally. There are also specialized lenses on the market that cannot be used on stabilizers even of moderate weight, such as the Sony E PZ 18-200mm f/3.5-6.3 OSS.



Motor torque = downward force on the lens (G)  $\times$  distance from the lens to the axis of the motor (d)

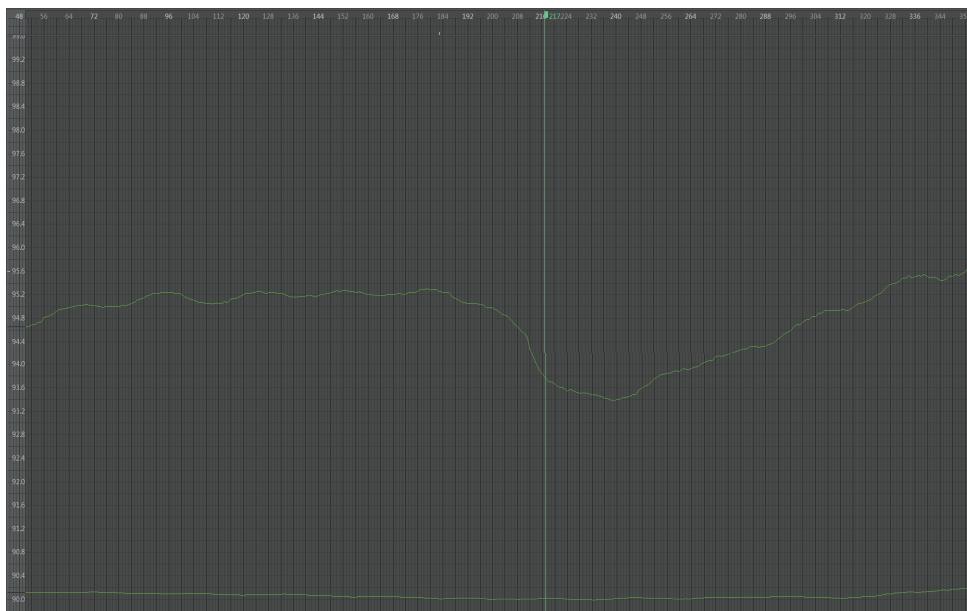
## SPACE FOR BALANCING

The heavier the camera and lens, the more movement space the configuration needs for stabilization. When shooting with longer lenses, it is very likely that there is not enough space for the gimbal to stabilize the camera before an axis arm makes contact with the lens. Therefore, when deciding the rated payload, the actual mounted equipment should be considered for whether it can be balanced.



## STABILIZATION PERFORMANCE

Even if the above two conditions are met, it is still necessary to observe whether the gimbal can provide sufficient stabilization, which is usually judged by subjective experience. DJI calculates the actual stabilization performance by tracking and modeling a feature point in test footage and calculating its offset frame by frame. These calculation results are shown below:



Stability test performed by the Cinema 4D

In this figure, the x-axis represents the number of frames of the footage, and the y-axis represents the offset of the pitch axis. The lower line shows the calculated stability of footage shot with Ronin-SC, and the upper line is the reference calculation of another camera stabilizer.

### Test Conditions:

Ronin-SC: The lens is Sony A7M3 + 24-105, the focal length is 24mm, the overall weight of the device is 1.96 kg with counterweight, and the gimbal retains default settings to shoot a video in 25fps in a straight line while running.

The other stabilizer: The lens is Sony A7M3 + 24-105, the focal length is 24mm, the overall weight of the device is 1.86 kg with counterweight, and the gimbal retains default settings to shoot a video in 25fps in a straight line while running.

## **4. CONCLUSION**

- The rated payload of a camera stabilizer must take into account the center of gravity of the camera and lens, whether there is enough space for balancing, and whether it can provide sufficient stabilization.
- The heavier the rated payload, the better the compatibility and anti-disturbance of equipment combinations. However, a heavier payload also requires more space within the gimbal for the different combinations to achieve balance.
- The rated payload of a stabilizer should be a reference for users based on rigorous tests and comprehensive evaluation of balancing, motor operation, and stabilization performance under different operating conditions.
- The user should consider the rated payload and the real test results to comprehensively evaluate gimbal performance under various working conditions before selecting what shooting equipment to mount.

## **5. APPENDIX**

Access payload test results of Ronin-SC in the Ronin-SC Camera Compatibility List. This document shows how effectively the Ronin-SC works with different camera and lens makes and models.

This document will be updated regularly. The Ronin-SC Camera Compatibility List is found on the Ronin-SC product page of the official DJI website.