LASER HARD KILL SYSTEM

The 3kW **JP-LWS3C Laser Hard Kill System** is a system that physically destroys unmanned aerial vehicles (UAVs), focusing on stopping the UAVs directly without replying on signal interference. It integrates high-energy laser technology, electronic information systems, and image processing to achieve intelligent recognition, high-precision tracking, and laser-based damage to long-range UAV targets, enabling rapid target neutralization.

The system integrates detection, tracking and neutralization of UAV treats. It receives target guidance data from sensors such as radar to rapidly locate targets, while an imaging subsystem enables intelligent recognition and automatic tracking that uses its own separate sensor. It can be precisely converged at long range to physically neutralize UAVs.

A centralized, user-friendly interface coordinates all subsystems, controls laser output and video recording, and monitors system status.

The system is fully interoperable with Soft Kill systems, capable of seamless data exchange with the command and control system for effective target engagement, as well as includes safety functions to prevent laser emission toward personnel.

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MAIN FEATURES

LASER HARD KILL SYSTEM

Image Processing System

High-precision Visible Light Camera：The high-precision visible light camera is mainly used for target acquisition and tracking in daytime conditions. It has the longest focal length and highest resolution in the system, making it easier to identify and judge typical unmanned aerial vehicles (UAVs), with a maximum detection range of more than 4km.

Low-precision Visible Light Camera The low-precision visible light camera is mainly used for target acquisition and tracking in daytime conditions, with a maximum detection range of 2km for typical UAVs.

Turntable Control System

The tracking and pointing turret adopt an overall structural layout of a two-axis horizontal U-shaped mount, which is characterized by high stability and good expandability.

It is mainly composed of a horizontal axis system, a vertical axis system, a base system, a torque motor, a slip ring and other components, and serves as a bearing platform for the low/high-precision visible light cameras and the laser launch optical system.

MAIN FEATURES (CONTINUED)

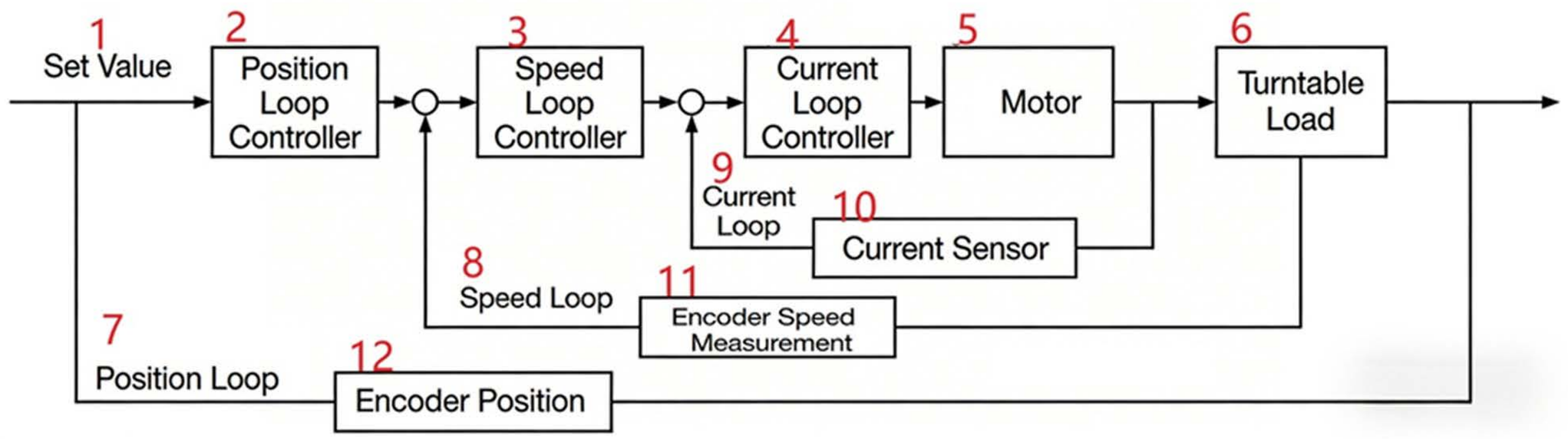
LASER HARD KILL SYSTEM

Servo Drive

The servo turret tracking controller receives commands, status and error signals from the upper computer, encoder and other components, and then forms a control voltage to drive the servo turret motor to rotate through comprehensive processing, so as to complete the operation and control of the turret, realize control modes such as follow-up, positioning and tracking, and further achieve precise position pointing to obtain accurate angular information between two parties.

The motor control system adopts a cascade compound control scheme combining the current loop, speed loop and position loop. The control structure principle of the azimuth axis is shown in the picture below, and the control structure principle of the pitch axis is the same.

Schematic diagram of the azimuth axis control system structure



Stabilizer

The stabilization function of ATP (Acquisition, Tracking, and Pointing) refers to enabling the load mounted on the turntable to resist external disturbances (such as carrier motion, wind load, and vibration) in a dynamic environment and accurately maintain or track its preset pointing angle in inertial space through the coordinated servo control of two degrees of freedom: the azimuth axis and the pitch axis.

Its core lies in disturbance isolation and precise tracking, serving as a critical technology for photoelectric tracking.
With the support of the stabilization function, the 2D turntable is endowed with the following core capabilities:

High-precision static pointing: Precisely drive and lock the load at the specified azimuth and pitch angles, providing a stable reference platform for tracking or striking operations.

MAIN FEATURES (CONTINUED)

LASER HARD KILL SYSTEM

Stabilizer (Continued)

Dynamic target tracking: Real-timely adjust the angles of the two axes according to external commands or feedback from built-in sensors (e.g., TV/infrared trackers), keeping the line of sight aligned with the moving target continuously.

Disturbance isolation and suppression: Actively compensate for low to medium frequency disturbances caused by ground micro-vibration, wind disturbance or carrier (vehicle/ship) motion through a high-bandwidth closed-loop control system, maintaining the stability of the line of sight.

TECHNICAL CORE

The realization of the stabilization function relies on the in-depth integration of precision mechanical structures; high-performance servo drives and advanced control algorithms

Mechanical Structure

The shafting is precisely designed and laid out with a compact structure and high-precision components, making it suitable for multi-sensor integration.

Servo Control System

Closed-loop control: A high-precision, high-performance closed-loop control is adopted to ensure the accurate execution of commands. High-precision sensitive components (**gyroscopes**, shown in the picture below) are used as the core devices of the closed-loop control to detect external disturbances.

Advanced Control Algorithms

On the basis of traditional control algorithms, adaptive control is adopted to cope with load changes and unmodeled dynamics, improving the robustness and tracking accuracy of the system.

TECHNICAL SPECIFICATIONS

LASER HARD KILL SYSTEM

HIGH-PRECISION VISIBLE LIGHT CAMERA

System Attribute	Parameter
Aperture	150mm
Effective pixel number	1024*1024
Frame rate	100Hz
Pixel size	6.5μm×6.5μm
Focal length	1200mm fixed focus

LOW-PRECISION VISIBLE LIGHT CAMERA

System Attribute	Parameter
Aperture	68mm
Effective pixel number	1024*1024
Frame rate	100Hz
Pixel size	6.5μm×6.5μm
Focal length	25～500mm continuous zoom

TECHNICAL SPECIFICATIONS (CONTINUED)

LASER HARD KILL SYSTEM

MAIN TECHNICAL SPECIFICATIONS

System Attribute	Parameter
Laser emission power	≥3kW
Beam mass M2	≤1.3
Length of laser armored cable	4m
Launch aperture	150mm
Effective tracking range	≥2000m
Effective range of destruction	≥1000m
Range detection	≥2000m
Duration of destruction	3s~20s
Target recognition	precision ≥97%
Target tracking accuracy	≤7.5urad (RMS)
Continuous operation prior to recharge rate.	≥90s
Horizontal working range	360°
Vertical working range	-15°～+75°
Maximum tracking angular velocity	100°/s
Maximum tracking angle acceleration	50°/s²
Fine tracking angular velocity	≥20°/s
Fine tracking angular acceleration	20°/s²
Working temperature	-20℃～+50℃
Storage temperature	-30℃～+60℃
Protection Rating	IP65 equivalent to Military Standard (GJB 150A)