

FLIGHT TEST CAGE

自由度测试系统平台

Flight test enclosure platform

把高风险试飞，关进一块可控场地

Contain high-risk flight tests within a controlled space

金属框架与柔性防护网围合出六面封闭空间，高动态与失效模式试飞不必每次申请空域。

A metal frame and flexible protective mesh form a six-sided enclosure for dynamic and failure-mode flight testing, reducing the need for separate airspace applications for each test.

金属网笼	无人机	飞行包线
Metal mesh enclosure	UAVs	Flight envelope
场地形式 Facility	适用对象 Suitable aircraft	验证项目 Validation scope

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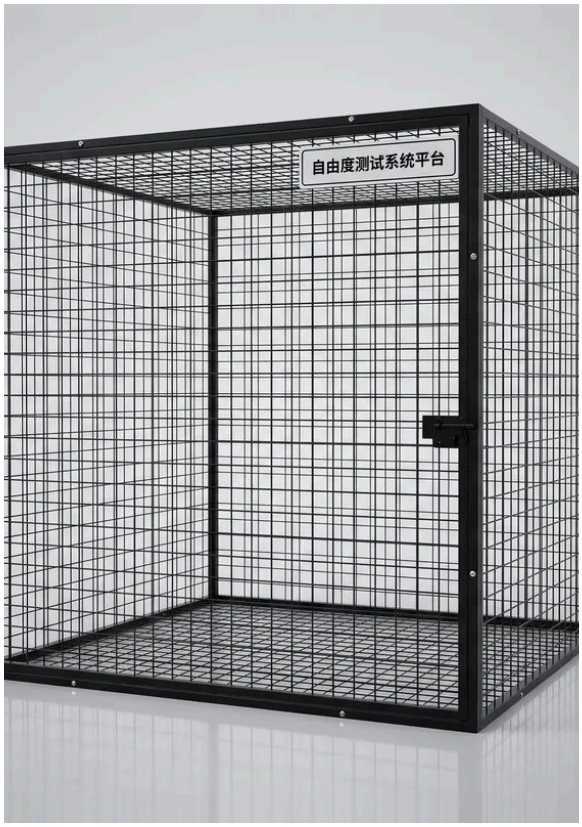
01 试飞的风险不在飞行本身

Managing the risks around flight testing

自由度测试系统平台用金属框架与柔性防护网围合出一块封闭式飞行测试场地。六面封闭的网笼把高动态、高风险的机动试飞关在可控范围内完成，不必为每一次验证单独划设空域。场地为可拆装结构，运输到场后按流程组装即可投入使用；网笼只负责约束飞行边界，试验数据由舱外的地面设备采集与记录。

The flight test platform uses a metal frame and flexible protective mesh to enclose a flight-test area on all six sides. It contains highly dynamic, high-risk maneuvers within a controlled boundary, reducing the need to designate separate airspace for each validation. The structure can be disassembled for transport and assembled on site. The enclosure defines the flight boundary, while external ground equipment acquires and records test data.

参数 Parameter	规格 Specification
场地形式 Facility	**封闭式金属网笼** Enclosed metal cage
适用对象 Suitable aircraft	**中小型无人机** Small and medium UAVs
验证项目 Validation scope	**飞行包线 • 失效模式** Flight envelope · Failure modes
结构形式 Structure	**可拆装，运输到场后组装** Demountable; assembled on site after transport



02 为什么要一个笼子

Why use an enclosure?

把试飞关进笼子里

Keep flight tests inside the enclosure

六面封闭的金属网笼为飞行划出明确边界，高动态与失效模式试飞不必每次单独划设空域。

A six-sided metal mesh enclosure defines a clear flight boundary for dynamic and failure-mode testing, reducing the need to designate separate airspace for every test.

框架与网面分工

Frame and mesh serve distinct roles

碳钢方管搭起骨架承担结构载荷，柔性防护网面覆盖六面，飞行器始终在网笼内部。

Carbon-steel square tubing carries structural loads, while flexible protective mesh covers all six sides to keep the aircraft inside.

整装可拆

Demountable construction

场地为可拆装结构，运输到场后按流程组装，转场不必重建。

The demountable structure is assembled after transport and can be relocated without rebuilding.

铭牌可追溯

Traceable identification

正面设铭牌，场地名称与使用方信息一眼可查，多场地并行时不会认错。

A front nameplate identifies the site and operator at a glance, helping distinguish multiple installations.

03

三个部位，决定笼子的强度与体验

Three details that shape strength and usability



框架节点焊接

Welded frame joints

方管交接处的焊接节点，是整笼受力最集中的位置。

Welded joints where square tubes meet carry the enclosure's most concentrated loads.

1. 焊缝饱满连续，节点处无咬边
   Full, continuous welds without undercut at the joints
2. 横竖管在节点处相接，框架刚度由此保证
   Horizontal and vertical tubes meet at the joints to provide frame rigidity



网笼门铰链与锁具

Enclosure door hinges and lock

侧开检修门。铰链与锁具保证门体在反复开关之后仍然贴合到位。

A side-opening access door with hinges and a lock that maintain proper fit through repeated opening and closing.

1. 铰链座与门框一体安装，转动到位不松垮
   Hinge mounts integrated with the door frame provide firm, consistent movement
2. 锁具与门框贴合，闭合后无明显缝隙
   The lock fits the frame closely, leaving no noticeable gap when closed



铭牌与场地标识

Nameplate and site identification

正面铭牌标注场地名称与使用方信息，多场地并行时不会认错。

The front nameplate identifies the site and operator to distinguish multiple installations.

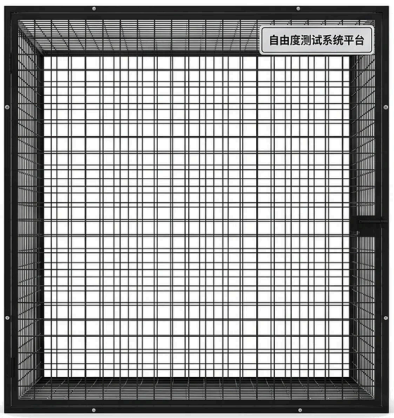
1. 铭牌固定于正面框架，位置正对进出方向
   The nameplate is fixed to the front frame, facing the access direction

04 标准三视图

Standard three-view drawings

正视图、四分之三侧透视图与俯视图，笼体结构与开合方式一览。

Front, three-quarter perspective and top views show the enclosure structure and door operation.



正视图

正视图

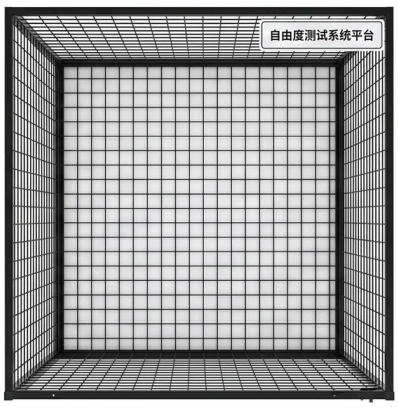
Front view



四分之三侧透视图

四分之三侧透视图

Three-quarter perspective view



俯视图

俯视图

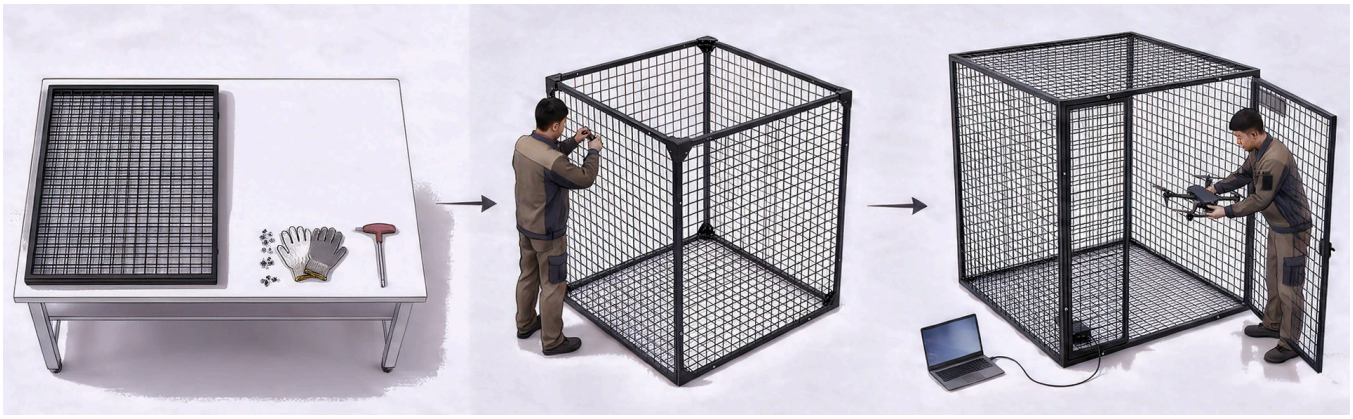
Top view

05 从到货到能飞，三步

Three steps from delivery to flight

场地为整装结构，运输到场后按流程组装即可投入使用，无需在原址浇筑基础。

The structure can be assembled after delivery and put into use without casting a foundation on site.



01 物料齐套

Check delivered materials

框架件、网面、门体与五金按清单到齐，逐件核对规格与数量。

Check frame components, mesh, doors and hardware against the delivery list, verifying specifications and quantities.

02 结构组装

Assemble the structure

方管框架按三视图拼装，节点逐处紧固，随后挂装防护网面。

Assemble the square-tube frame according to the three-view drawings, secure each joint, and install the protective mesh.

03 联调试飞

Commission and test fly

门锁到位后接入地面设备，进行首轮联调与试飞验证。

Secure the door lock, connect the ground equipment, and perform initial commissioning and flight validation.

06 完整技术参数

Full technical specifications

参数以出厂规格书为准，如有特殊需求可联系我们定制配置。

Specifications are subject to the factory specification sheet. Contact us for custom configurations.

参数 Parameter	规格 Specification
产品名称 Product name	**自由度测试系统平台** Flight test enclosure platform
场地形式 Facility	**封闭式金属网笼** Enclosed metal cage
框架材料 Frame material	**碳钢方管** Carbon-steel square tubing
防护网面 Protective mesh	**柔性金属网，六面封闭** Flexible metal mesh enclosing all six sides
场地尺寸 Site dimensions	**按需定制** Custom dimensions available
适用对象 Suitable aircraft	**中小型无人机** Small and medium UAVs
验证项目 Validation scope	**飞行包线 · 失效模式** Flight envelope · Failure modes
门体形式 Door design	**侧开检修门，配铰链与锁具** Side-opening access door with hinges and lock
场地标识 Site identification	**正面铭牌** Front nameplate
结构形式 Structure	**可拆装，运输到场后组装** Demountable; assembled on site after transport
供电与采集 Power and data acquisition	**由舱外地面设备承担** Provided by external ground equipment

