HNFlyer Technology
科 技 融 入 理 想

Flyer Survey Unmanned Vessel

USV-W110

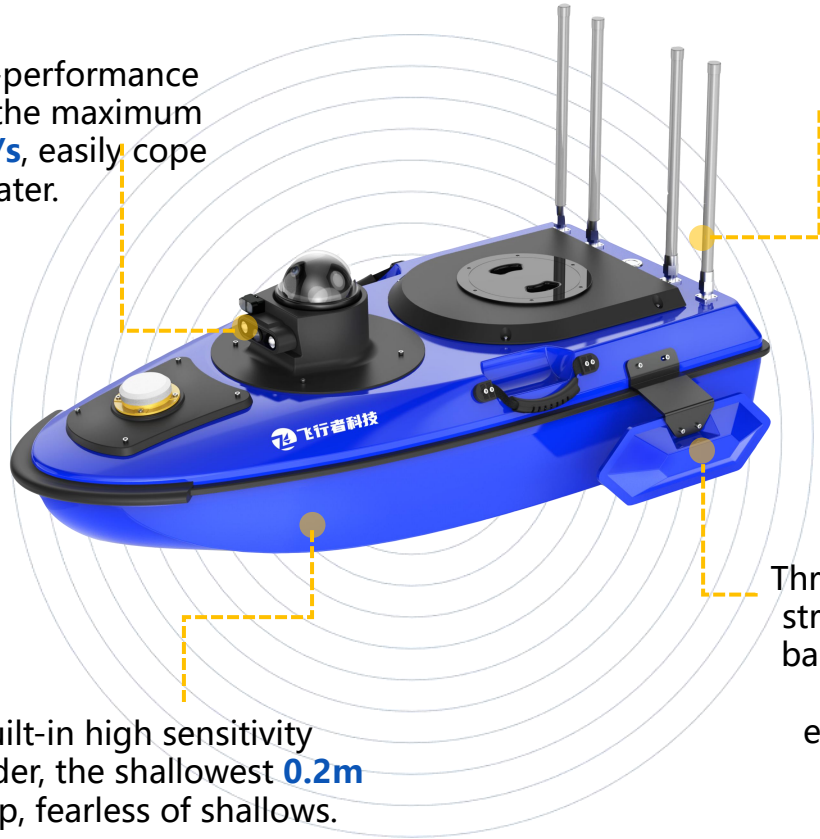
Hainan Flyer Science and Technology Co.,Ltd.

HNFlyer Technology
科 技 融 入 理 想

USV-W110
Flyer Survey Unmanned Vesse

Equipped with high-performance pump-jet thrusters, the maximum speed can reach **5m/s**, easily cope with fast water.

Long life, two batteries, to meet the needs of a day of work.



20
Maximum load (kg)

4
Wind wave rating (Class)

5
Maximum speed (m/s)

0.2-200
Range of sounding (m)

Built-in high sensitivity sounder, the shallowest **0.2m** deep, fearless of shallows.

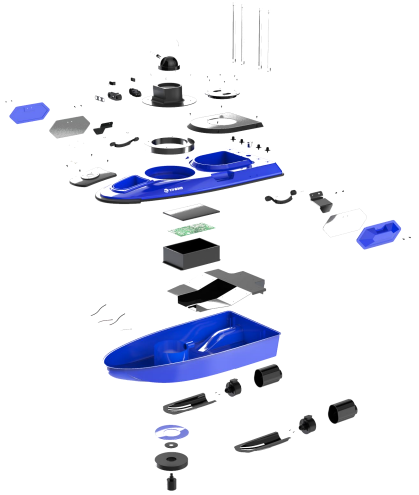
Through the design of the ship's streamline slope and the blade barrier, the probability of water grass entangling can be effectively **reduced by 60%**.

Application scenarios: Marine patrol, Marine emergency rescue, Marine transportation.....

HNFlyer Technology
科 技 融 入 理 想

USV-W110
Flyer Survey Unmanned Vessel

argument



2m/s
Cruising speed

20kg
Maximum load

7kg
Weight

0.2-200m
Depth range

5m/s
Maximum speed

≤4class
Ability to withstand wind and waves

4h
Endurance time

110cm
Hull length

Design concept:
No one's boat, wisdom travel miles

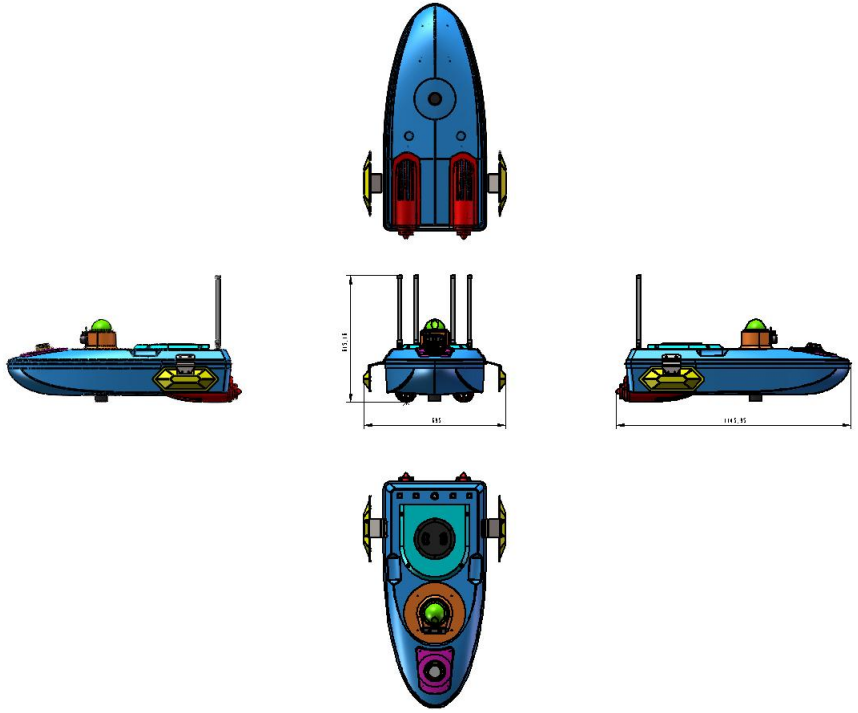
Multifunctional module design

Centimeter-level positioning, accurate and worry-free Plan the path, navigate autonomously, save manpower

Centimeter-level positioning, accurate and worry-free. Plan the path, navigate autonomously, save manpower.

"Zhixing" refers to the unmanned ship's advanced sensors and artificial intelligence algorithms that enable autonomous navigation , path planning and obstacle avoidance.

General layout design



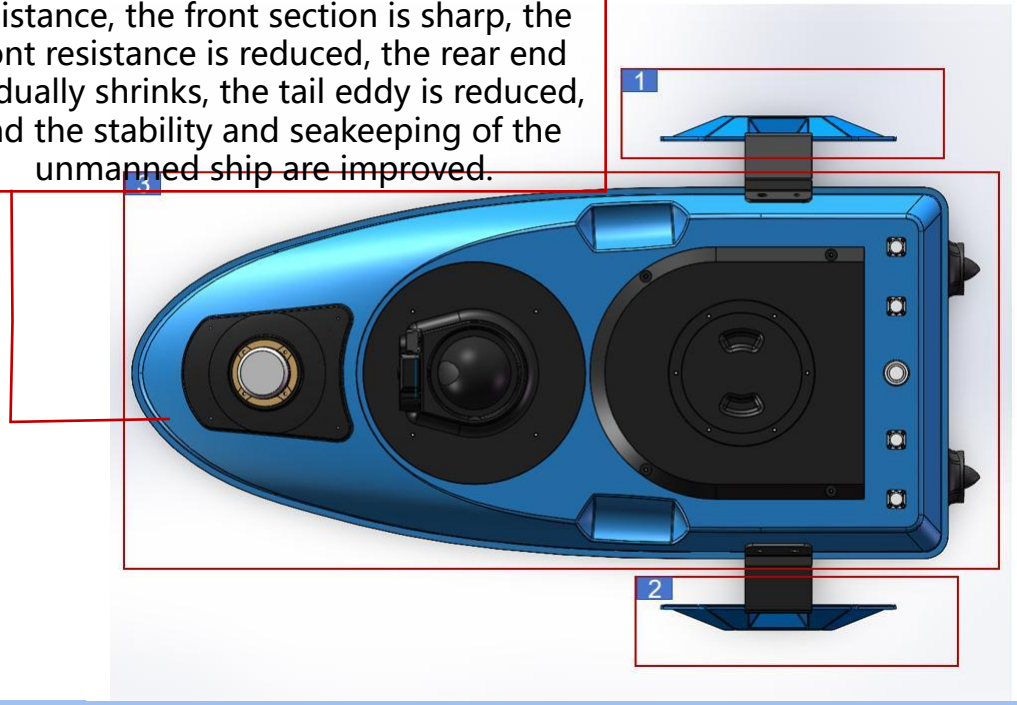
The design of "Miles" emphasizes the pilot's unique control module system , ensuring the stability and safety of the unmanned ship , so that it can still sail thousands of miles in the complex Marine environment.

01 Industrial design a hull shape optimization

The innovative hull shape optimization design reduces overall drag by 17% and increases endurance by 35%

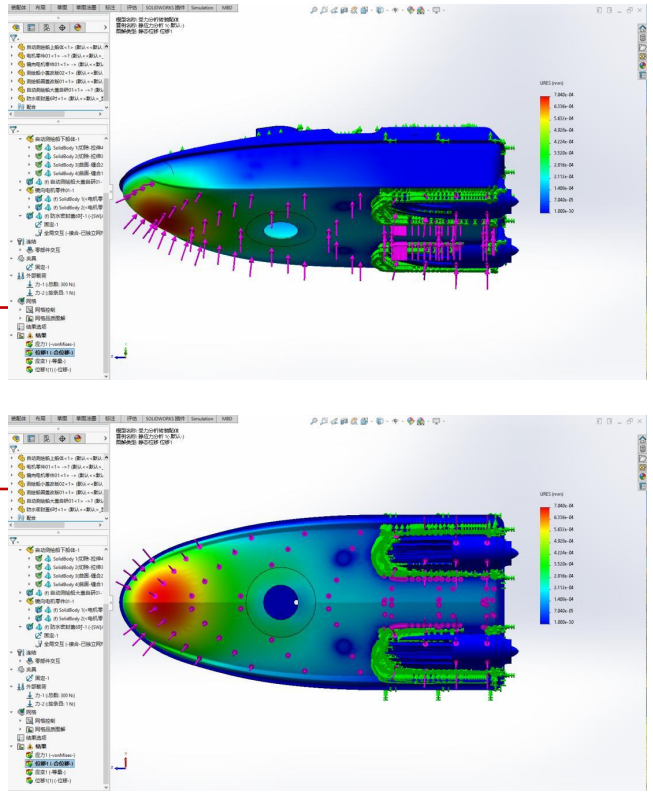
1、Streamlined design

In order to reduce the water flow resistance, the front section is sharp, the front resistance is reduced, the rear end gradually shrinks, the tail eddy is reduced, and the stability and seakeeping of the unmanned ship are improved.



2、Multi-scale structure optimization

- The deformation and displacement of unmanned hull subjected to external forces are analyzed.
- To predict and analyze the water situation of the hull under different working conditions, and provide scientific basis for the design.

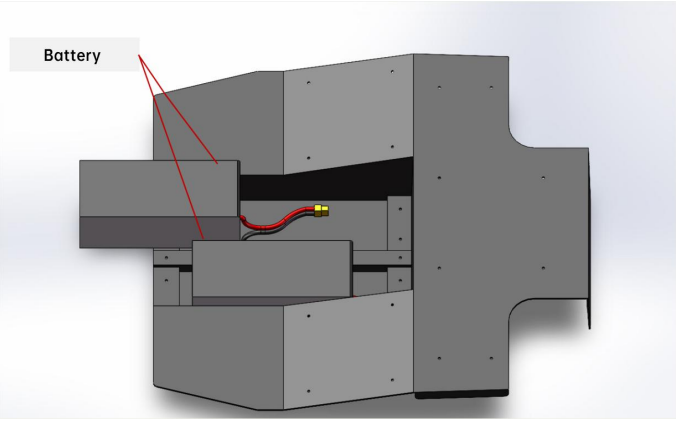


The multi-body structure design of the unmanned ship can provide better stability and help to **reduce the resistance of movement in the water**. This design is conducive to improving the sailing efficiency and stability of the unmanned ship.

This product is capable of operating at **≥30kg of compression shock pressure** and dealing with more complex scenarios.

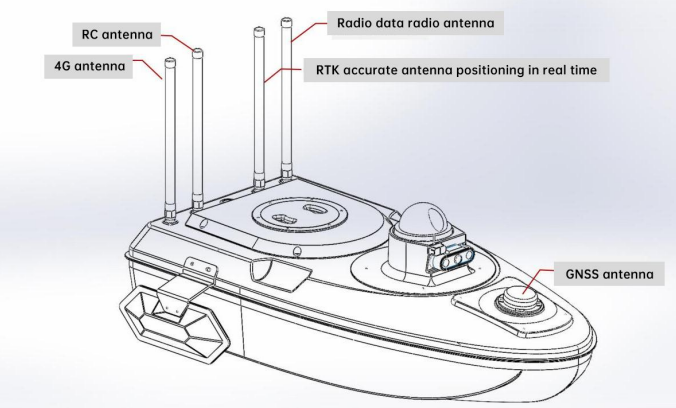
02 Industrial design — Modular design

The unmanned ship adopts five functional modules integrated design, aiming to improve the maintainability, scalability and adaptability of the unmanned ship.



2.1Dynamic modular design

The power module includes two 22000mAh capacity batteries , achieving up to 4 hours of mission life , which is 20% more than similar products on the market.

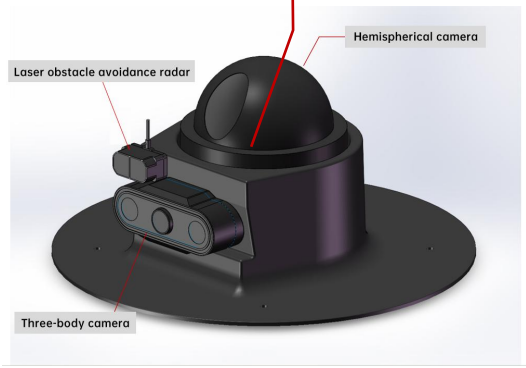


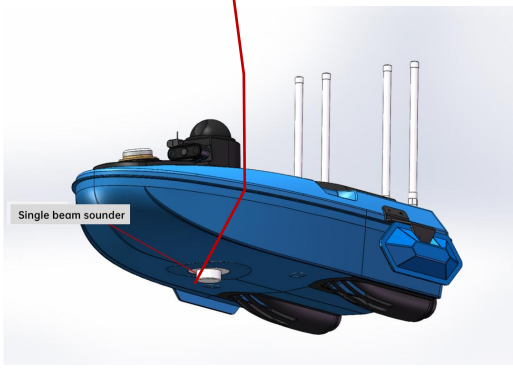
2.2Communication module

In terms of positioning , based on RTK real-time accurate positioning antenna and cm-level accuracy real-time dynamic positioning aerial antenna , accurate positioning and orientation of unmanned ship ≤10cm can be achieved.

1、Sensor integration
①Vision sensor capable of 360° omnidirectional video.
②Laser obstacle avoidance radar to achieve autonomous collision avoidance.

2、Single beam sounder
It can be realized in aquaculture areas, shoals, port areas and other near-shore shallow
Water complex sea area.





2.3Sensor data acquisition module

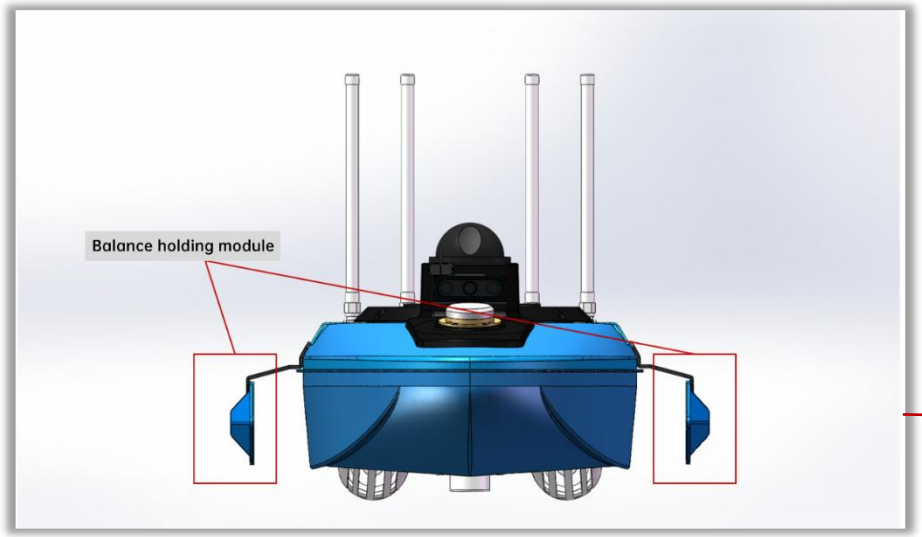
Unmanned ships can obtain high-precision bathymetric data and topographic data , providing data support for Marine ecological protection and restoration , Marine pasture construction , and Marine disaster prevention and control.

02 Industrial design — Modular design

The unmanned ship adopts five functional modules integrated design, aiming to improve the maintainability, scalability and adaptability of the unmanned ship.

3、Buoy design

Buoys are designed on both sides of the main body of the unmanned ship to provide additional buoyancy, help stabilize the hull and resist the influence of external forces such as wind and waves.

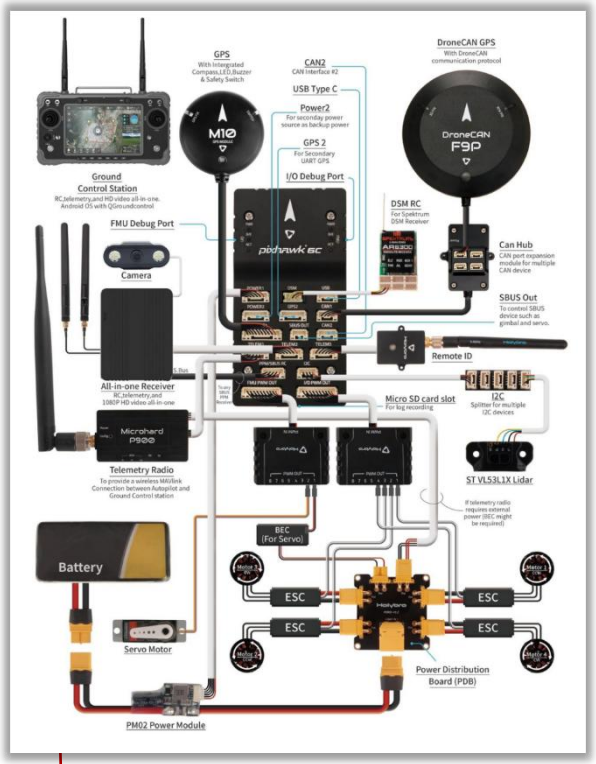


2.4Balance holding module

Combined with the horizontal control of the control system , It can effectively improve the stability of the unmanned ship's operating attitude.

4、Control module

The modular design of different control functions is adopted , and **the dual drive independent control scheme** is adopted to realize the separation of remote control and computer control , so that the remote control can control the unmanned ship independently.

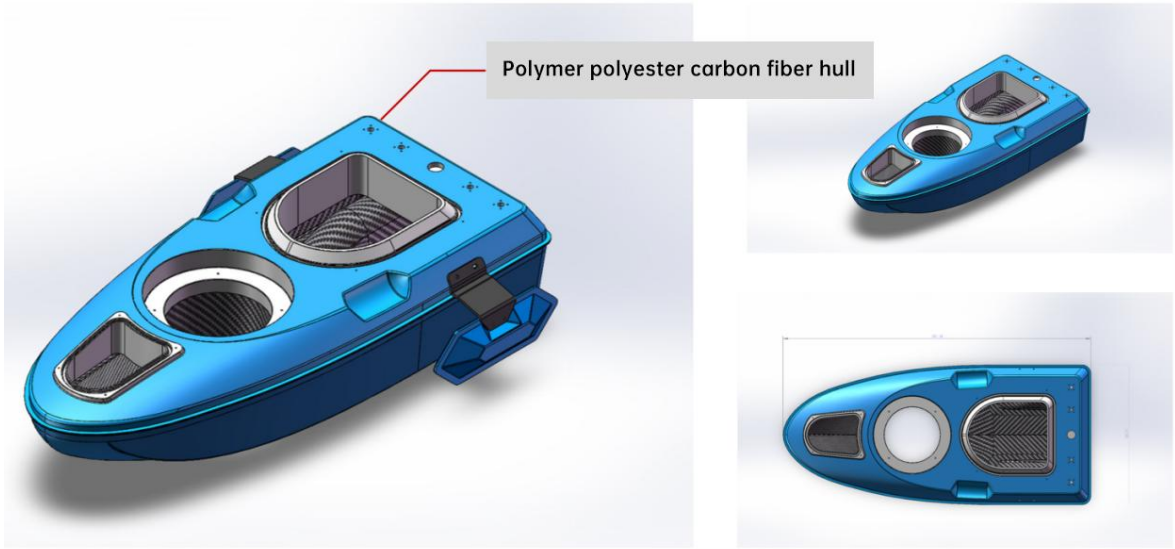


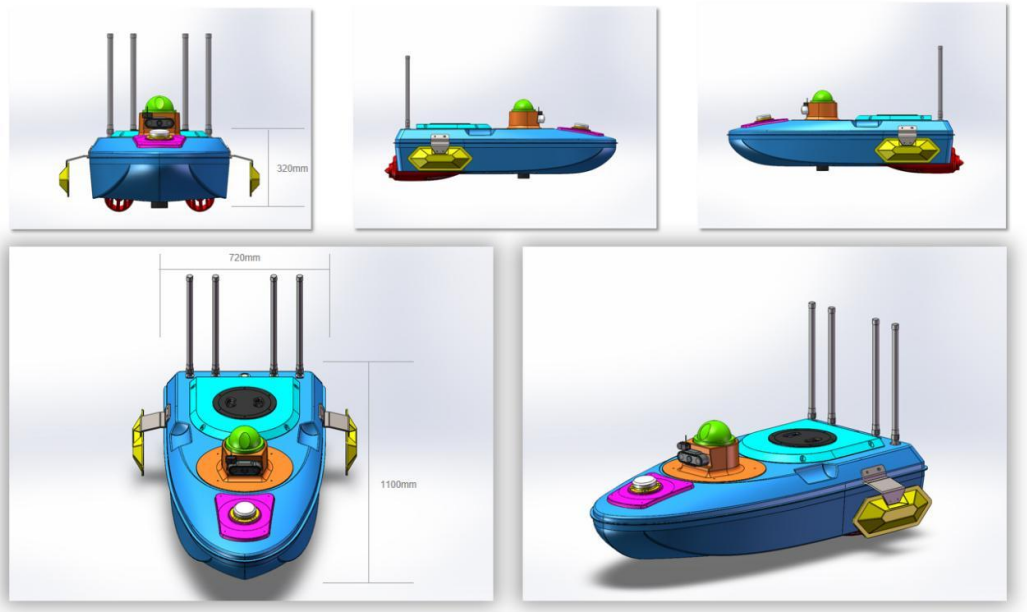
2.5Control module

The control module enables autonomous navigation and mission execution , reducing the need for manual operation and improving operational efficiency and safety.

03 Industrial design—Lightweight and environmentally friendly design

High performance and high strength lightweight materials can be used to ensure the strength of the hull while reducing the weight by 21%.



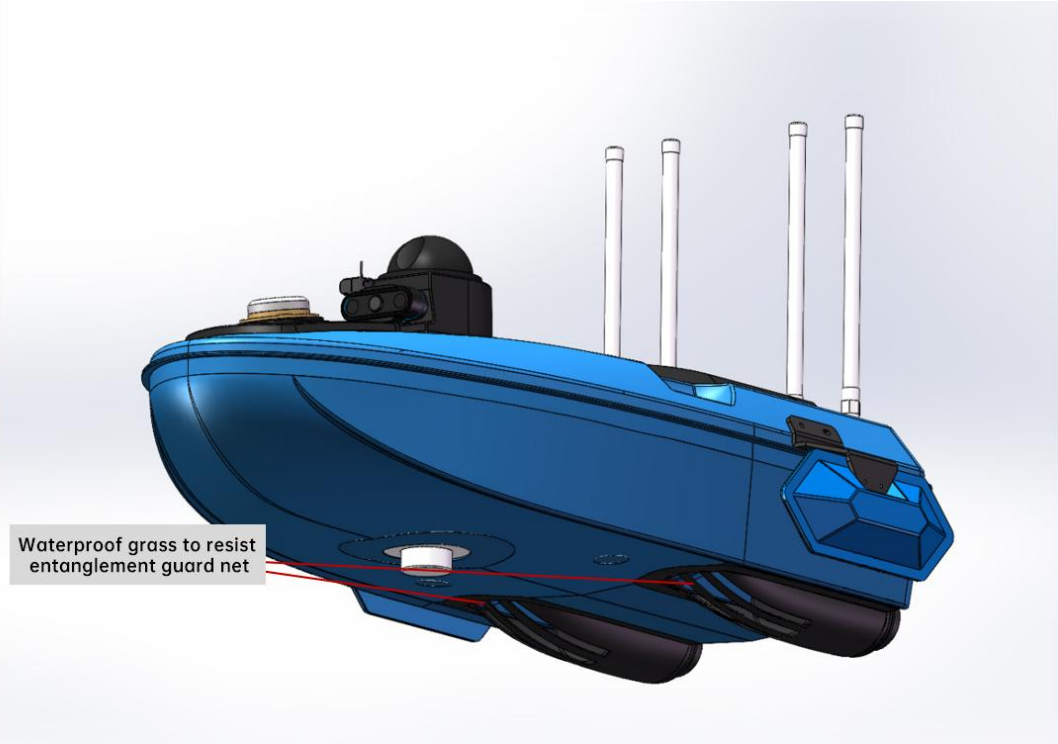


It meets the needs of lightweight hull and environmental protection , while ensuring the stiffness and strength of the structure , reducing the weight of the hull and water flow resistance by more than 10%

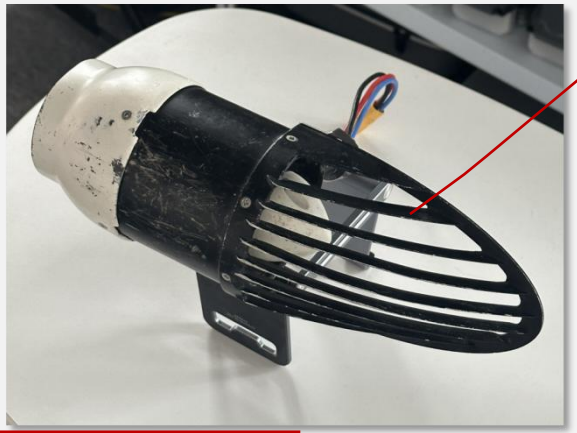
The unmanned ship weighs 7 kg , supports single easy operation , facilitates rapid deployment , and ADAPTS to various mission scenarios.

04 Industrial design —Waterproof grass anti-winding protective net design

The bottom protective net is a blade type spacer structure, which is conducive to water flow through, reduce resistance, and effectively reduce the probability of water grass entanglement by 60%.



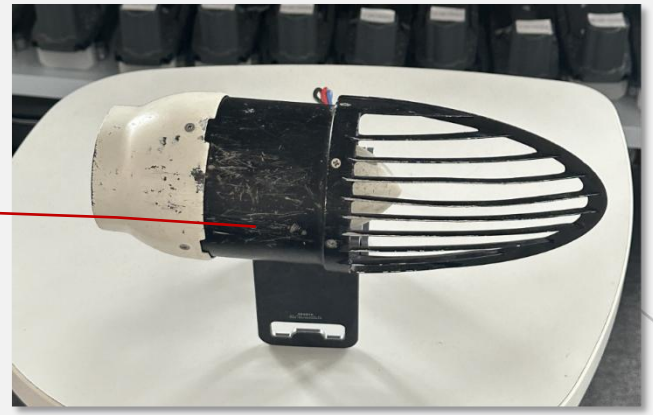
A protective net is installed around the bottom drive of the unmanned boat to cover the drive and prevent it from being affected by water weeds and fishing nets , effectively reducing the chance of water weeds dying by 60%.



The protective net is a blade type spacer structure

The structure is based on fluid mechanics and uses an important arrangement of curved blades to ensure uninterrupted flow while minimizing flow resistance.

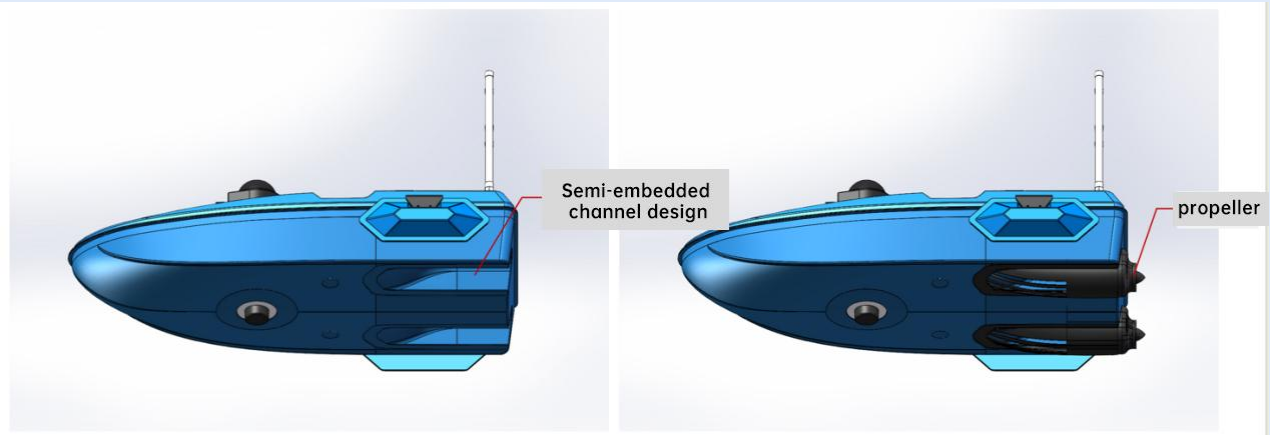
The mesh is made of corrosion-resistant materials to ensure its durability in underwater environments.



05 Industrial design—Semi-recessed culvert thruster design

Equipped with double pump jet culvert thrusters, the maximum speed reaches 5 m/s, and the powerful power escorts the operation.

The design also has high propulsion efficiency and sailing stability , especially in terms of seakeeping , to provide stable power output , so that the unmanned ship can maintain good handling at various speeds. It can effectively improve the adaptability and operational efficiency of unmanned ships.

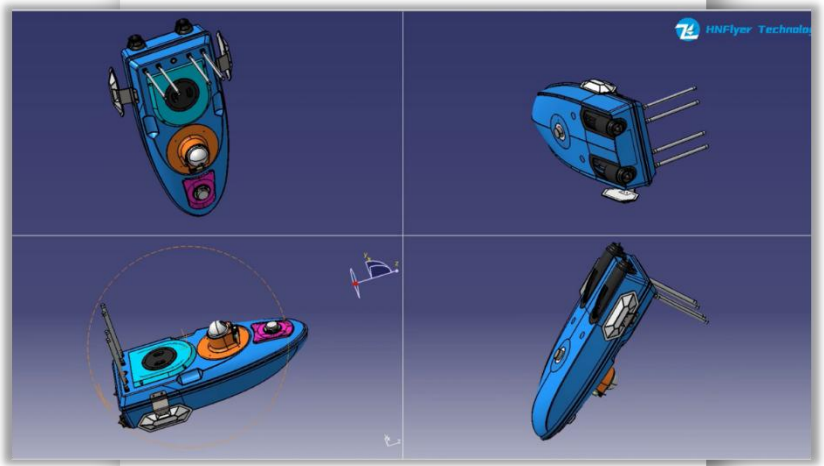


The semi-embedded design of the thruster helps to reduce the interference of debris when working in the shallows.

Industrial design—Advantages and characteristics

Streamlined hull design

Streamlined design according to hydrodynamic characteristics



The hull adopts a streamlined design to reduce the current resistance, the front section is sharp, reducing the front resistance, the rear end gradually shrinks, reducing the tail vortex, improving the stability and seakeeping of the unmanned ship.

0.2 m ultra-shallow water operation

Built-in single beam sounder
Combined with the GNSS in the main control
20CM ultra-shallow draft, full water coverage measurement

Unmanned ships can obtain high-precision bathymetric and topographic data in complex coastal shallow waters such as aquaculture areas, shoals and port areas.

5M/S high speed sailing

Equipped with twin pump jet thrusters,
Powerful power for the operation escort

Make the propeller semi-embedded design, equipped with double pump jet ducted propeller, improve speed and navigation stability, 40% better than the industry level (industry ≤5m/s)

Product advancement

01 National invention patent

Design patent: "Unmanned Ship (Pilot Measurement USV-W110)"
Utility model Patent Certificate: "An intelligent control unmanned ship Based on Modular design"

02 National scientific and technological achievements evaluation report

Conclusion: Through the certification of the national authority, the product has reached the leading domestic and international advanced level, and it is suggested to accelerate the promotion and application.

国 家 知 识 产 权 局

100050

北京市西城区珠市口西大街 120 号 1 号楼 16 层 1622 房间 北京专赢专利代理有限公司
刘备(010-63106882)

发文日：2024年11月27日

申请号或专利号：202430287464.X　　发文序号：2024112700089280

申请人或专利权人：海南飞行者科技有限公司

发明创造名称：无人船（飞行者测量USV-W110）

办 理 登 记 手 续 通 知 书

根据专利法实施细则第 60 条及国家知识产权局第 244、272 号公告的规定，申请人应当于 2025 年 01 月 27 日之前缴纳以下费用：

第 1 年度年费	90.0 元	已费减 85%

附已缴费用情况：年费 0.0 元。

申请人按期缴纳上述费用的，国家知识产权局将在专利登记簿上登记专利权的授予，颁发专利证书，并予以公告。专利权自公告之日起生效。

申请人期满未缴纳或者未缴足上述费用的，视为放弃取得专利权的权利。

提示：

专利费用可以通过网上缴费、银行/邮局汇款、直接向代办处或国家知识产权局专利局缴纳。缴费时应当写明正确的申请号/专利号、费用名称及分项金额。未提供上述信息的视为未办理缴费手续。了解缴费更多详细信息及办理缴费业务，请登录国家知识产权局官方网站。

审 查 员：自动审查
联系电话：010-62356655

专利管理业务章

证书号第22044540号

专利公告信息

实用新型专利证书

实用新型名称：一种开放式深海潜航器的推进系统

专 利 权 人：海南飞行者科技有限公司

地　　址：570203 海南省海口市国兴大道5号海南大厦裙楼海南数据谷海创空间四层

发 明 人：翁泽龙;陈家豪;杜治法

专 利 号：ZL 2023 2 3598995.X　　授权公告号：CN 222062239 U

专利申请日：2023年12月28日　　授权公告日：2024年11月26日

申请日时申请人：海南飞行者科技有限公司

申请日时发明人：翁泽龙;陈家豪;杜治法

国家知识产权局依照中华人民共和国专利法进行审查，决定授予专利权，并予以公告。

专利权自授权公告之日起生效。专利权有效性及专利权人变更等法律信息以专利登记簿记载为准。

局长
申长雨

2024年11月26日

第 1 页(共 1 页)

报告编号：2022HA0018

科 学 技 术 成 果 评 价 报 告

中研汇智（评价）字[2022]第 0181 号

成 果 名 称：飞行者无人机无人智能控制系统
成 果 类 型：技术开发类应用技术成果
完 成 单 位：海南飞行者科技有限公司
委托评价单位：海南飞行者科技有限公司
委 托 日 期：2022 年 6 月 1 日
评 价 形 式：会议评价
评 价 机 构：河南省中研汇智科技成果评价中心
评价完成日期：2022 年 6 月 8 日

中 华 人 民 共 和 国 科 学 技 术 部

二零零九年制

评 价 结 论

2022 年 6 月 8 日，河南省中研汇智科技成果评价中心组织专家对海南飞

评 价 专 家 名 单

姓名	工作单位	职称	从事专业	签字
文振华	郑州航空工业管理学院航空发动机学院	教授	飞行器质量与可靠性	文振华
李丹松	中国航天科技集团公司第四研究院	研究员	飞行器动力工程	李丹松
张　臻	郑州航空工业管理学院智能工程学院	教授	控制科学与工程	张臻
席俊杰	全国工业技术学研究会	教授	飞行器动力工程	席俊杰
王　利	河南工业大学	教授	测控技术	王利

测，所检指标符合相关标准要求。

综上所述，该项目技术先进，实用性强，在无人机智能起降领域达到国内领先水平，在复杂场景多维感知协同智能起降系统技术达到国际先进水平。

建议：加快推广应用。

评价专家组组长签字：文振华

副组长签字：李丹松

2022 年 6 月 8 日

3

Application scenario

The pilot survey unmanned ship has a wide range of application scenarios and unlimited potential, and can carry out topographic survey, hydrological survey, maritime patrol rescue, Marine transportation and other work.

Scientific research

Maritime patrol

Topographic survey

Rescue at sea

The W110 unmanned survey ship provides a sunken ship search and salvage plan for the Hainan Blue Sky Rescue Team's maritime rescue patrol, greatly improving the efficiency and safety of the operation.