

CHCNAV

APACHE 4 LITE

**AUTONOMOUS HYDROLOGICAL
SURVEY USV**



**MARINE SURVEY
& CONSTRUCTION**

AUTONOMOUS HYDROLOGICAL SURVEY USV

The Apache4 Lite is an advanced Unmanned Surface Vessel (USV) specifically designed for hydrological survey, combining the best of high accuracy positioning and automated navigation control technology. APACHE 4 Lite USV builds around the operator's habits when conducting ADCP (Acoustic Doppler Current Profiler) hydrological cross section flow measurements, compatible with main stream underway ADCP systems on the market.

The lightweight design of the double-layered hull, with EasySail software in Android remote control, makes survey easy, safe and accurate. It is equipped with automatic navigation, adaptive straight-line water flow technology, and hover technology, significantly improving the accuracy of flow rate estimation.

Even when GNSS positioning might be degraded by obstructed environments, the internal GNSS+IMU module continues to provide reliable position and heading for the ADCP and autopilot controller.

ADVANCED NAVIGATION CONTROLLER

Integrated adaptive water flow straight-line and hovering technology.

The automatic control system allows the APACHE 4 Lite to navigate in a straight line along the cross section safely according to the profile view as the flow, turbulence, etc. changes by stable position and heading provided by GNSS+IMU. The hovering technology ensures that the APACHE 4 Lite hovers stably in the turbulent flow, improving the accuracy of the flow estimation.

ANDROID INTELLIGENT CONTROL

Android remote control makes work more efficient.

The remote controller controls APACHE 4 Lite via 4G or digital radio communication, supporting manual control or fully automatic navigation. To ensure the safety of the USV, the system supports automatic return to home when the battery is low or the connection is lost. Easysail app supports route planning, data collection, post-processing and other functions. The streamlined operation makes it easy for users to learn and makes the operation more convenient and efficient.

BUILT-IN POWERFUL MOTOR

Powerful power system allows USV to travel faster and farther.

APACHE 4 Lite uses a brushless DC motor with a maximum power of 1000 W and a maximum speed of 7200 rpm. The powerful power allows the USV to reach a maximum speed of 6 m/s. APACHE 4 Lite comes standard with two batteries, and the battery life of a single battery can reach 3.5 hours at a speed of 1.5 m/s; the battery supports hot-swap replacement without interrupting the USV operation process.

DESIGNED FOR ADCP SPECIALLY

Lightweight, less redundant design.

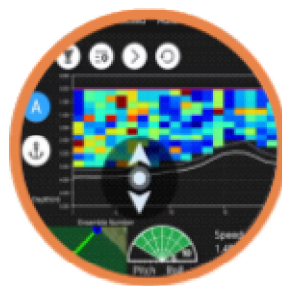
The APACHE 4 Lite hydrological test USV is designed for flow measurement of small and medium-sized rivers. The length is only 1 meter, the weight is 5 kg, and the volume is 20% smaller than APACHE 4, making it more convenient for transportation and operation. The mounting hole of ADCP is 17 cm, which is compatible with RS1200, M9, RiverRay and RiverPro. With RiverStar ADCP, it supports quick disassembly and assembly, and can be operated by one person.



**EFFICIENT
HYDROLOGICAL
SURVEY USV**



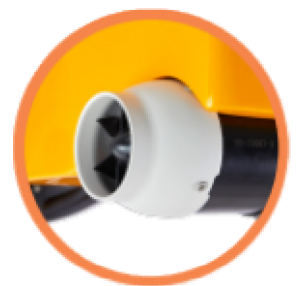
Remote control



EasySail Software



RiverStar ADCP



Semi-embedded motor

SPECIFICATIONS

Physical	
Hull Dimension (L x W x H)	1.0 m x 0.57 m x 0.27 m
Material	High strength and modulus carbon fiber
Weight (w/o instrument and battery)	5 kg
Maximum Payload	10 kg
Anti-Wave & Wind	3 rd wind level and 2 nd wave level
Hull Design	Triple-hull vessel
GNSS	Internal GNSS dual antenna
Waterproof	IP67
Draft	12 cm (unladen)
Indicator Light	Two-color light (Display satellite and positioning status)
Camera (optional)	Video resolution 1280 * 720 pixels
ADCP Mounting Hole	170 mm
Payload Compatibility	Compatible with RiverStar ADCP standardly, can be customized with echo sounder, water quality meter, side scanner
Automatic measurement	One button hovering or automatic hovering, adaptive adjustment of navigation parameters

Propulsion	
Type	Electric
Propeller Type	Brushless DC
Direction Control	Veering without steering engine
Maximum Motor Power	1000W
Maximum Motor Speed	7200 rpm
Motor Installation	Pluggable
Li-ion Battery Capacity	32.4V 23.1Ah rechargeable lithium battery
Power Supply	Support single battery independent power supply or dual battery balanced power supply
Battery Endurance	3.5 hours @ 1.5 m/s (running on 1 battery, support hot-swap)
Maximum Speed	6 m/s

Remote control	
Display Screen	1000 nit luminance
Resolution Ratio	1920*1200
Internal Storage	RAM 4GB, Storage 64GB
Endurance	5h
Communication Frequency	2.4 GHz

Peripheral Interface	USB port, Nano SIM card slot, TF card maximum support 128GB, Type-C
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Communications	
Data Communication	Standard 4G (supports LTE-FDD, LTE-TDD, UMTS, GSM global network standards) & digital radio
SIM Card Slot	eSIM and Nano SIM
Interface	2x RJ45 port; 3x RS232 serial port 1x RS485 serial port

Navigation Mode	Manual or Auto Pilot
Data Storage	Local storage (multi-channel storage) & Remote storage

Software	
Easysail	Supports switching between pseudo-color velocity profiles, satellite maps (including velocity vectortrajectories);
	Supports full-screen display of any interface;
	Supports data collection and processing;
	Supports output of flow test results tables;
	Supports data file code sharing and one-click file transfer to the computer;
Supports ADCP and software data synchronization	

Positioning	
Satellite System	BDS B1I/B2I /B3I、GPS L1C/A/L2P(Y)/L2C/L5、Galileo E1/E5a/E5b、GLONASS L1/L2、QZSS L1/L2/L5
Channel	1408
Single Point Position (RMS)	Horizontal: 1.5 m Vertical: 2.5 m
DGNSS Positioning Accuracy	Horizontal: 0.4 m + 1 ppm Vertical: 0.8 m + 1 ppm
RTK Positioning Accuracy	Horizontal: ±8 mm + 1 ppm Vertical: ±15 mm + 1 ppm
SBAS Positioning Accuracy	Horizontal: 0.5 m Vertical: 0.85 m
Heading Accuracy	0.1 ° @1 m baseline
Inertial Navigation Stability	6 %/h (Accuracy attenuation 1 m after 20 s)
IMU Update Rate	200 Hz

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FCC warning statements:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The device has been evaluated to meet general RF exposure requirement This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 40cm between the radiator & your body.