CHCNAV

APACHE 4

AUTONOMOUS HYDROGRAPHIC SURVEY USV

MARINE SURVEYING

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AUTONOMOUS HYDROGRAPHIC SURVEY USV

The APACHE 4 is a multi-platform unmanned surface vessel (USV) designed to support the CHCNAV HQ-400 multibeam echo sounder (MBES) and various acoustic doppler current profilers (ADCPs). It provides a fully autonomous hydrographic survey solution featuring shallow draft, high navigational accuracy, and stable hovering for measuring water flow velocity and discharge.

The APACHE 4 is optimized for cross-section flow measurements and integrates adaptive water flow navigation technology and automated hovering. Its GNSS+IMU module ensures reliable positioning and heading, even in obstructed environments, to enhance flow estimation accuracy. The APACHE 4 USV is ideal for collecting flow and velocity data in areas where manned vessels are impractical, such as dam structures and flood monitoring zones.

ADVANCED NAVIGATION CONTROLLER

Integrated adaptive water flow straight-line and hovering technology.

The automatic control system enables the APACHE 4 to navigate in a straight line along the cross-section, adapting safely to changes in flow, turbulence and other conditions. Stable positioning and heading, provided by the GNSS+IMU module, enable precise navigation. Hovering positioning technology enables the APACHE 4 to maintain a stable position in turbulent waters at the start and end points of ADCP observation, improving the accuracy of flow estimation.

COMPATIBLE WITH LEADING ADCPS

Up to 40 kg payload with broad system integration

Designed for cross-sectional flow measurement, the APACHE 4 is compatible with ADCP models such as RiverStar, M9, RTDP 1200, RiverPro, and RiverRay. It offers integrated support for positioning, power, waterproofing, and 4G data transmission.

OPTIONAL SENSOR INTEGRATION

Modular access for expanded sensor compatibility

The APACHE 4 features a central shaft for mounting additional instruments, including optional CHCNAV multibeam echosounders. Its modular design supports a variety of applications, from hydrological surveys to disaster response and harbor infrastructure work.

INTELLIGENT ANDROID REMOTE CONTROLLER

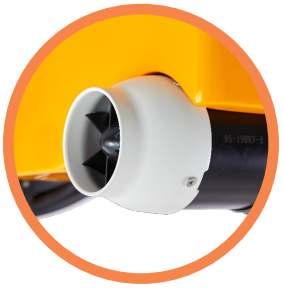
Real-time data access and mission control

The APACHE4 Android-based controller enables reliable operation via 4G and 2.4 GHz connectivity. Paired with the CHCNAV EasySail app, it supports real-time data monitoring, video feedback, route planning, and post-processing.

EFFICIENT HYDROGRAPHIC SURVEY USV

Transducer

ADCP access shaft



Semi-embedded motor

SPECIFICATIONS

Physical	
Hull Dimension (L x W x H)	1200 mm x 750 mm x 400 mm
Material	High strength, high modulus carbon fiber
Process	HPT one-piece molding
Weight (w/o instrument and battery)	13 kg
Maximum Payload	40 kg
Anti-Wave & Wind	3rd wind level and 2nd wave level
Hull Design	Triple-hull vessel
GNSS	Internal GNSS dual antenna
Waterproof	IP67
Draft	8.6 cm (unladen)
Indicator Light	Two-color (positioning and differential signal)
Camera	360° omnidirectional video
ADCP Mounting Hole	240 mm
ADCP Compatibility	Compatible with RiverStar, M9, RiverPro, RiverRay, RioGrande and other ADCP
Available Instrumentation	ADCP, integrated compact multibeam echosounder, side scan sonar, water quality monitor, sampling bucket
Obstacle Avoidance Distance & Range	0.2–40 m (H: 112°, V: 14°)

Propulsion	
Propeller Type	Brushless DC
Direction Control	Veering without steering engine
Rated Motor Power	800 W
Maximum Motor Speed	7200 ± 5% RPM
Motor Installation	Pluggable
Li-ion Battery Capacity	32.4 V, 23.1 Ah
Battery Endurance	9.8 h @1.5 m/s (1 battery set, expandable)
Power Supply	Single/dual balanced battery support
Battery Replacement	Hot swap supported
Charging Time	3 h
Maximum Speed	6.5 m/s

Remote control	
Dimension (L x W x H)	346 mm x 196.5 mm x 89.4 mm
Display Screen	10-inch
Resolution Ratio	1920 x 1200
Internal Storage	RAM: 4 GB, Storage: 64 GB
Battery Endurance	5 h
Communication Frequency	2.4 GHz
Peripheral Interface	USB, Nano SIM, TF card (up to 128 GB), Type-C

Communications	
Data Communication	Standard 4G and Remote control
Remote Control Range	1 km (Remote); Unlimited (4G)
SIM Card Slot	Nano SIM
Reserved Interface	2x RJ45 ports, 2x RS232 serial ports
Navigation Mode	Manual or Auto-Pilot
Data Storage	Local (multi-channel) & Remote

Software	
Easysail	Route planning and autonomous navigation. Total mileage statistics, remaining mileage reminder, multi-angle video and online map display. Hull parameter control, physical & virtual joysticks, system self-check at power-on. Waveform overlay and attitude correction. Coordinate conversion, trajectory, water depth, waveform and hull parameter real-time display. Online software/firmware updates. Export via USB/Type-C. Single beam mode: Data collection and post-processing. Hydrological mode: Flow test results output. Multibeam mode: Real-time parameter adjustment.

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
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
Radio Protocols	Satel 3AS, CHC (1), TT450, Transparent
Heading Accuracy	0.1 º @1 m baseline
Inertial Navigation Stability	6 º/ h (accuracy attenuation 1 m after 20 s)
IMU Update Rate	200 Hz

D270 Single beam Echo Sounder	
Data Type	CHCGD (1) , NMEA SDDPT/SDDBT, original waveform
Sounding Range	0.1 m to 200 m
Sounding Accuracy	±0.01 m + 0.1% x D (D is the depth of water)
Resolution	0.01 m
Maximum Sampling Rate	30 Hz
Frequency	200 kHz
Beam Angle	6.2° ± 1°
Sound Velocity Adjustment Range	1400–1700 m/s
Integrated Water Temperature Sensor	-55°C~+100°C, real-time correction of the sound speed

*Specifications are subject to change without notice.
(1) CHCGD & CHC protocol is CHCNAV format.

WWW.CHCNAV.COM | MARKETING@CHCNAV.COM

CHC Navigation Headquarter
Shanghai Huace Navigation Technology Ltd.
577 Songying Road, Qingpu,
201703 Shanghai, China
+86 21 54260273

CHC Navigation Europe
Office Campus, Building A,
Gubacsi út 6, 1097
Budapest, HUNGARY
+36 20 421 6430
Europe_office@chcnav.com

CHC Navigation USA LLC
6380 S. Valley View Blvd, Suite 246,
Las Vegas, NV 89118, USA
+1 702 405 6578

CHC Navigation India
409 Trade Center, Khokhra Circle,
Maninagar East, Ahmedabad,
Gujarat, India
+91 90 99 98 08 02