

CK-14 - Compact ASV Data Sheet

A compact surface autonomous vehicle (Fig.1) designed to carry up to 40kg of payload with an hydrodynamic design. The housing is comprised of carbon fibre with a Kevlar hull, making it robust and durable whilst being lightweight and less magnetic than other drones. Additionally, due to the exterior being treated with Gelcoat, the unit is resistant to long exposure to UV and saline conditions, the coating also adds to its waterproof qualities. The ASV shape and hull has been designed based on strict nautical standards enabling enhanced stability and buoyancy which is not affected by the small size of the vessel nor the 40kg payload.



Fig 1. Ck-14 (Made in Italy) with the fitted GPS, antenna and back frame and an example bathymetry dataset captured using the CK14 with sonar. Image courteously provided by Codevintec Srl

It is fully customisable, allowing the operator to add equipment to the vessel depending on their survey requirements. The additional hull space allows the integration of echosounders, multibeam & side scan sonars, Lidar, cameras, Sub bottom profilers, ADCPS and other hydrographic systems which can be combined for a multidisciplinary approach to shallow water projects. As shown in Fig.2, the top cover of the unit is removeable for easy access to the interior where the electronics, batteries (16,000mA LiPO) and instruments are kept. The hull "Moon Pool" is 33 x 27cm allowing a wide range of hydrographic equipment to be kept which does not impact the rigidity of the ASV, with fully charged batteries the system can run for a full survey day (12hrs).

Two brushless propellers can work independently to provide the best maneuverability and are protected by the hull, no need for rudders or levers which can be damaged during transport; two carry handles are fitted on each side of the ASV and a carry eyebolt for towing and lifting.



Fig 2. CK-14 Surface autonomous vessel in use within a harbor and wide river (shallow water environments) as well as an image of the internal electronics, power and housing in which you can connect any serial devices. Image courteously provided by Codevintec Srl.

A rugged Windows PC is used to control the ASV communication, navigation and on-board instruments. Numerous hydrographic software can be installed and used with the system such as Qinsy, Teledyne PDS and Hypack.

Additionally a sextant module can be fitted to the unit to allow the CK-14 to communicate with a 6ch, 2.4GHz remote control unit and managed via PC, Tablet or smart phone.

Alternatively, the CK-14, can be fitted with the Sestante (Fig. 3) autopilot module to transform the CK14 to ATV from USV. Sestante uses the ground control station on the vessel (16hr battery life) and a smart controller (7" touchscreen console) with 10hr battery life. Multiple users can access the navigation and on board instruments allowing the operator and supervisor to follow the survey in real time from another location. This is manually controlled via long range WIFI or 4G network or completely autonomous.



Fig. 3. Sestante autopilot system designed by Codevintec, image shows the ground control unit which fits to the ATV and the smart controller which is used by the operator to control the system, image courteously provided by Codevintec Srl

Features

- Compact/ Robust design built out of Kevlar and Carbon Fiber
- Up to 12hr battery life will last the whole survey day (depending on payload)
- Integrate multiple hydrographic instrumentation at any one time
- Two counter rotating propellers enhances maneuverability
- Sestante autopilot system, allows multiple users to control and manage on-board instruments

Product Dimensions

Physical	Dimensions (L x W x H)	Weight
(instrument only)	140 cm x 90 cm x 35 cm (or 45 cm with rollbar)	15 kg (without payload)

Technical Specifications

Materials:	Carbon Fiber and Kevlar; Gelcoat finish and PVC reinforcements
Payload:	up to 40 kg
Type and Moon Pool dimensions:	Displacement Hull; 31.5 cm x 25 cm
Propulsion:	Two fully-flooded, low maintenance, three phase brushless motors with counter-rotating propellers of 6.7kg thrust (each). The propellers are protected by the hull shape
Performance:	4 Knots (Max), 3 Knots (Cruise) and 6 Knots (Hi-Speed)
Power:	Dual Independent power lines for drone and payload ; Two separated lines 12/24V for the payload; 4S, 15C, 16,000 mA LiPo batteries with low self discharge ; up to 12hrs navigation autonomy
Remote Control:	2.4GHz radio control, 6 independent channels, 30 programmable memories integrated display
Standard payload:	Industrial PC intel with windows 10; GNSS receiver
Optional payload:	Sestante autopilot with 7" smartcontroller; 4G communication Integrated winch MBES, SBES, SSS, ADCP, SBP, CTD, Multiparametric probes, Magnetometers, GNSS RTK receivers, GNSS Compass, MRU, IMU, INS, Lidar, Third-party instruments (subject to technical validation)

Videos

CK-14: ASV - marine drone for hydrographic and bathymetric surveys
<https://www.youtube.com/watch?v=QCDxV22LV7Q>