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LanderPick, a Remote Operated Trawled Vehicle to cost-effectively deploy and recover lightweight oceanographic landers

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Landers are modular structures equipped with miscellaneous sensors and monitoring equipment which are positioned directly on the seabed to operate autonomously for a defined timeframe. A drawback of landers intended to operate for prolonged periods in the deep ocean is the high cost of recovery systems, typically depending on buoyancy modules plus expendable ballast, or requiring ROVs assistance. LanderPick concept consists of the design of a specific trawled vehicle to deploy and recover lightweight oceanographic landers not provided with recovery elements, but having a capture mesh that facilitates their hitching. The LanderPick vehicle is technically a ROTV (Remote Operated Trawled Vehicle) controlled through a standard coaxial electromechanical cable that allows real-time control from the vessel. Navigation is enabled by a low-light high-definition camera, aided by spotlights and laser pointers. Small propellers aid in the final precision approach maneuvers. A mechanical release allows the precise placement at the sea bottom of landers carried as a payload, as well as their recovery by means of a triple hook. First sea missions of the system were carried out successfully in 2021 in southern Biscay. A 4-month deployment of a lander array equipped with current-meters along an energetic canyon axis provided unprecedented detail in the progression of the internal tidal bore. Short (48-hours) deployments of a fully-instrumented lander, including lapse-time image and baits in a deep seamount summit within a marine protected area, provided insights on the biodiversity of a unique ecosystem. The LanderPick novel approach to cost-effectively and precisely deploy and recover lightweight oceanographic landers allows to conceive (i) monitoring systems based on the deployment of arrays or fleets of low-cost landers and (ii) experiments associated with deep habitats such as coral reefs in which it is necessary to locate landers with great precision.