SUMMARY
Review of the existing solutions for AUVs (Autonomous Underwater Vehicle) docking stations and study of its applicability in the OBSEA (Expandable Seafloor Observatory) for the recharge and data download of the Guanay II AUV developed by the SARTI research group. The project will develop the position control system, for AUV approaching to the docking; acoustic beacon, USBL location system and artificial vision system for relative location of the AUV in respect to the docking; latching mechanism to engage the AUV to the docking; power and data interface systems to recharge batteries and data download; and Launch and Recovery (LAR) system to deploy and recover the docking and AUV from a support vessel.

MOTIVATION AND RESULTS
Every day experimental marine research requires more information with new parameters and better space-time resolution. This implies than traditional way to collect marine data from research vessels or autonomous instruments (buoys or ocean bottom devices) it's not enough and new techniques are being used. Satellites are providing global information from the ocean surface, and cabled observatories bring long term data series from specific points. These technologies now are being complemented with autonomous underwater vehicles (AUV) that can monitor continuously big areas with accurate space resolution. In Vilanova i la Geltrú (Fig.1) we have the OBSEA cabled observatory installed at 4km from the coast and 20 meters depth [13] [14] (Fig.2, Fig. 3). SARTI is developing also AUV called Guanay II [11][12] that can navigate on the sea surface up to a set of predefined points to then acquire data in vertical profiles (Fig. 4). All the autonomous equipment have same weak points, the battery autonomy and data transmission. These drawbacks can be partially solved by the use of docking stations for battery recharge and real time data transmission. With the docking stations is possible to maintain the AUV permanently in water reducing operational costs due to support vessels are not required all the time. The AUV docking stations can be static, connected to a cabled observatory or mobile if they are connected to a buoy, Autonomous Surface Vehicle (ASV) or vessel. In any case the AUV must be capable to approach to the Docking and connect to the supply and communications systems. The AUV will need a combination of positioning sensors and control algorithms in order to park in the docking automatically. Some research institutes have developed different approaches for this mission. Current AUV are using Ultrashort Base Line (USBL) systems [3], transponder or acoustic beacon [1][4], artificial vision with CCD camera [2][10] or a combination of these three [7], in addition it exists mechanical guidance systems [6] and sonar systems in combinations with visual aids [8]. Each method has some strong and weak points that must be considered such as cost, precision, range, etc. and usually the final solution must contain a combination of two or more. In this paper will be reviewed the existing available technologies and its applicability to the OBSEA project to connect the GUANAY II AUV.

REFERENCES
Fig. 3: Diagram of the OBSEA. Detail of the control electronics located in the junction box.

Fig. 4: AUV Guanay II working principle


