Abstract - This paper describes the development of a continuous production energy machine from marine trochoidal waves. Studying the characteristics of trochoidal waves in a geographical area near Cartagena, we have developed a device, which taking advantage of the marine surface oscillation in order to produce the movement of a mechanical device, is able to transforming the mechanical energy into electrical energy.

Keywords – wave energy, point absorber, renewable energy, trochoidal waves

I. INTRODUCTION

At present, the marine renewable energetic resources are one of the sets of power sources with an enormous potential. However, its exploitation is minimally developed. Its origin is constituted by the character of immense energy collector that form the seas and oceans, which occupy about 70% of the surface of the planet and storing on 1.3x10^9 km3 of water, are the largest existing energy reserves on earth and besides renewable [1].

The wave resource is ten times more energetic than solar or wind. In addition, its high energy density, high availability and low environmental impact are a good starting point to study a type of energy in continuous development [2].

In Spain they are also pursuing a number of projects in wave energy, a total of 26 were recorded in 2013, mainly on the coast of País Vasco, Cantabria, Galicia and the Canary Islands.

Despite the lack of financial support to all renewables in Spain, big Spanish companies such as IBERDROLA, SENER or ABENGOA and research centres such as TECNALIA continue active in the ocean energy sector. There are also some enthusiastic small companies developing and testing wave and tidal current concepts. At a regional level, there is some support mainly from the two regional governments of the Basque Country and Canary Islands. Their respective open sea test facilities, bimep and PLOCAN, are now fully prepared to install and test wave energy devices. Mutriku OWC plant in the Basque Region has now more than three years of continuous operation. There is further some initial interest in this field growing in other regions such as Andalucía and Galicia. [3]

The operating principle of the device is being moved with a sinusoidal wave. The float and reciprocates by a mechanical system, connecting rod - crank, moving a generator rotor. This assembly is in a tight frame, supported on a structure at a given level of seabed.

II. PROJECT DEVELOPMENT

Currently, existing technologies are very diverse, depending on the characteristics of the wave resource (wave height and period) and depending on the location of the device and the power selected for each unit. Therefore, the comparative advantage over existing systems is the use of a simple, robust, reliable and easy to maintain mechanism, leading to a reduction in costs. Moreover, its mechanical characteristics, the device performs as a continuous artifact energy production due to the pendulum movement that provides the wave for small wave heights.

The type of device for the conversion of wave energy of this project is known as point absorber, i.e. two bodies that move vertically relative to each other by the effect of buoyant forces on bodies due to the wave elevations. The first body is called floater and is moved by the waves, while the second body, provides hydrodynamic stability, maintains its position against displacement of the waves. For the design of the energy absorber it is needed a hydrodynamic study at the location where it is desired to install, in order to find the most frequent wave height, besides analyzing the characteristics of the trochoidal wave [4].

This project, which is being developed as Final Degree Work, has focused on the coastal area of Cartagena (see Fig.1). In the same issue of the energy needs of small facilities, but also can be used to power autonomous systems and to reinforce conventional generation facilities studied. Power extraction under consideration is about 15 kW.
The project is currently in the phase of improving the design of the absorber and the preparation of an experimental prototype (see Figures 1 and 3).

REFERENCES

ID49- A DRONE BASED SYSTEM FOR SURVEILLANCE APPLICATIONS IN COASTAL ZONE.
Adrián Cantero, David Gallego, Pedro López, Rafael Molina, Gonzalo Sánchez, Agustín Sueldo, Antonio Guerrero, Antonio Guillamón

Abstract- This paper introduces an unmanned aircraft vehicle (multicopter) for coastal applications. This vehicle has surveillance purposes, and it is configured with routes in such a way that the vehicle is capable of displaying them automatically, transferring information in real time to a base station. In this paper the applicable regulations about this kind of applications are analyzed.

Keywords- Multicopter, drone, surveillance,

I. INTRODUCTION.
Technology has been approaching and marking our lives for centuries, reaching up to a point in which we have seized it with great strength. This dependency, somewhat, does not become an issue to us, since with a proper use of technology, an improvement in the quality of life of the human being is achieved. Nowadays, the usage of drones is spreading, looking for its place depending on their usefulness. The drone applications are diverse, from military use to video recording for films or professional aerial cartography. Nevertheless, in vigilance and rescue where the use of drones are being forgotten and would have a place welcomed and acknowledged. In this issue is where drones, aerial and submarines both, could perform rescue activities, such as carrying a life vest or helping in searching for missing people, due to aerial drones has a better accessibility in complicated areas where it is hard to visualize form a helicopter and get there, or even carry a DEA (automated defibrillator) / DESA (semiautomated defibrillator), so that if the victim were in cardiorespiratory arrest, it could keep him alive until the life-sustaining support arrives.

Vigilance and rescue in coastal zones are areas where the usage of drones must be present, due to any advance in technology which improves the quality of life as prevention, safety, and physical integrity get reinforced, is worth to be encouraged.

II. UPCT DRONE TEAM
UPCT Drone Team is a student association whose purpose is to promote new technologies of unmanned vehicles among students. Six students from Universidad Politécnica of Cartagena take part in this association.

III. SYSTEM DESCRIPTION.
The drone is a multicopter with 4 blades (65x65 cm), height of 25,4cm and weight of 700gr. Made of plastic, with a maximum load capacity of 500gr. The drone includes a GoPro camera hitched to a gimbal, which allows the camera to orient in a range of 180 degrees. In the picture a photograph of the vehicle is shown:

IV. APPLICABLE REGULATIONS.
The current regulation in Spain allows research and development activities, as well as aerial observation and surveillance including recording. However, this kind of activities are restricted to unpopulated areas and not controlled airspace. Flying in the proximity of seashores and sea is allowed. A license is required in order to be authorized to pilot drones, as long as aircrafts weight do not exceed 25kg. In addition, activities must be carry out with suitable light, with a maximum height of 120m. Any activity in which the drone uses airspace must be authorized by AESA.

REFERENCES