Water is essential to all known life forms; this covers 3/4 (71%) of the surface of the Earth. 97 percent of that water is salty water, which is found primarily in the oceans and seas; only 3 per cent of its volume is freshwater. Of the latter, only a 1 per cent is in liquid state. The remaining 2% is in solid state in layers, fields and ice shelves or sea-ice at high latitudes. Outside the polar areas, freshwater is found mainly in wetlands and underground aquifers, still often hard to reach.

Water needs for human consumption have increased drastically. That is why in some communities where the shortage of rainfall, extremely poor areas, natural disasters, or other many phenomena can cause the lack of freshwater for consumption. Different technologies to alleviate this lack have been generated. In the absence of water affecting many coastal countries this project try to give a new solution to the lack by designing a seawater desalination barge fueled with clean energy based on Fuel Cells.

**Abstract:** SeaGuardII DCP is a recent multi-parameter data collection platform that offers new and innovative capabilities. The Doppler Current Profiling Sensor (DCPS) features advanced tilt compensation algorithms using information from a three axis solid state compass and an accelerometer to give true horizontal current measurements on moving and leaning platforms at up to 50 deg tilt. If one of the acoustic beams is not able to measure the horizontal current correctly, for example if there are objects like lines and floats in it, the sensor automatically suggests current calculations using the three remaining un-disturbed beams for the concerned cells. The user can select acoustic broadband to save power and get profiles with reduced variation, or narrow band to get profiles with longer range. When deployed upward looking the sensor can measure the cm thick surface current, which is a useful feature when looking at spreading and transportation of e.g. an oil spill. SeaGuardII DCP has expanded the capacity to serve as an observatory by hosting multiple sensors (e.g. analog, serial and long sensors strings with more than 20 sensors on it using a CAN-bus system). Furthermore two acoustic profiling sensors (DCPS) can be plug-and-play connected to the same instrument making it possible to profile upwards and downwards simultaneously, reaching the double range with the same moored instrument. The power consumption of the instrument and most of the sensors used on it is low. In a configuration focusing on studying the carbon systems with sensors to measure Currents, Salinity, Wave/Tide/Pressure, Temperature, Turbidity, Chlorophyll A, Oxygen, pH (optode) and pCO2 (optode) the instrument is capable of logging data for more than one year at 30 min interval using internal batteries. Depending on the goal of the measurements and/or to save power sensors can be logged at different time intervals e.g. in a Tsunami warning application it is possible to log data from the pressure sensor at high frequency and keeping the other sensor running slower. For on-line two-way communication the instrument has USB, Serial (RS232, RS422) capabilities and support operation of various modems (Radio, GPRS, GOES, Iridium, AIS). The intention of this conference presentation is to briefly describe the instrument and illustrate some its capabilities by giving different examples from field applications.

**Keywords:** Multi-parameter Observatory, Sensors, Current Profiling, pCO2, pH