

# Energy Harvesting power on board a yacht

## Overview:

Energy Harvesting is the process by which energy is obtained from external sources such as Solar, Wind and kinetic energy (movement). By investigating induced EMF using a magnet and coil, the movement of a yacht might be used to generate electricity (Kinetic energy). This generated electricity could be used for a small GPS in the event of power failure on board and as a backup for long distance passages.

## Aim:

To investigate induced EMF and to suggest designs for a power supply system for a long distance yacht using the motion of the ocean as the generator. Suggest what this power may be suitable for.

**Equipment required:** LogIT uLog pH adapter (set units to +/- 1250 mV)  
BNC to 4mm (or equivalent) connection leads  
Coil of wire (pre-made or use a cardboard tube and copper wire)  
Strong magnet  
Ruler or similar to mount the magnet  
Modelling clay, sticky tape or similar

## Hazards:

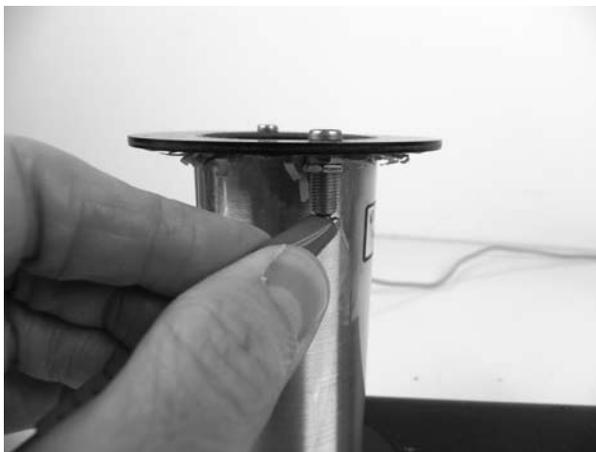
Always check your local regulations or the school advisory service for guidance on the use of laboratory equipment. Students should be supervised at all times.

## Suggested Method:

1. Connect the uLog sensor to the computer.

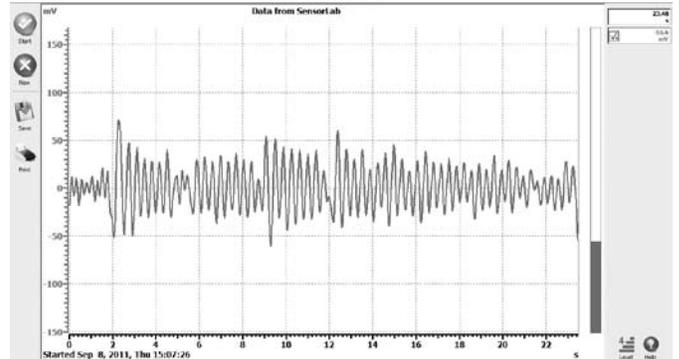


2. Connect the coil to the mV adapter using the connection leads and connect to the uLog sensor.

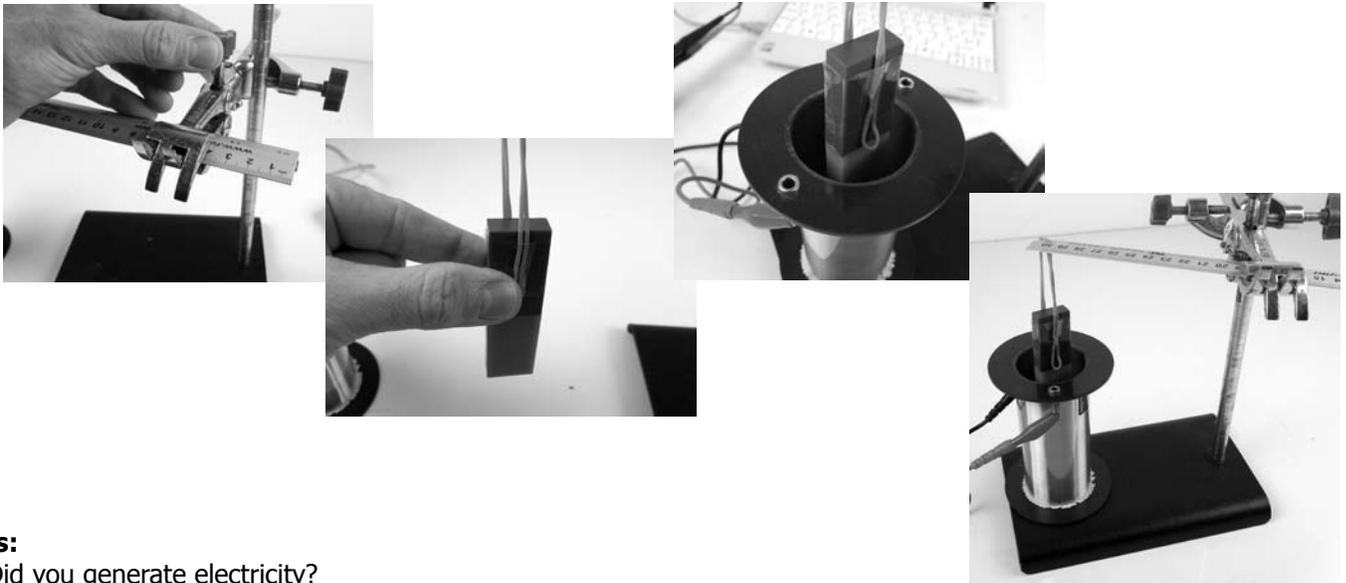


# Energy Harvesting power on board a yacht - continued

3. In the software, select the 'mv' range and then press the uLog button to start logging. Dip the magnet in and out of the coil and observe what happens to the voltage on the graph.



4. You now need to come up with a design which allows the magnet to dip in and out of the coil as the yacht moves on the ocean. For this example, we tried a long flexible ruler and an elastic band, suspending the magnet on the end which caused the magnet to move vertically inside the coil as shown.



## Results:

- Did you generate electricity?
- What type of electricity has been produced?
- What needs to be done with this voltage before it can be used as an electrical generator?
- Is the amount of electricity good or do you think improvements need to be done?

## Going further:

- Is the current produced enough to charge batteries for a hand held GPS? If not, why not?
- How would you improve your design?
- This example only really captures the vertical movement of the yacht, what would you do to capture all movement such as the lateral movement as well?
- You may like to look at 'Energy Harvesting' and how it is used in remote areas of the world and on large vehicles such as trains.