Submergible Energy Apparatus: Linearly Extending Generator (SEA-LEG)

Thanos, Alexander

The project concerns the development of an energy generator capable to absorb kinetic energy of deep water currents in tidal regions. A linear device named “SEA-LEG” accumulating the action of forces acted upon a sequence of interconnected drag elements (“sails”) has been constructed in two different versions. The sails experience the force of flowing water and can drive an electric generator. It has been observed that curved flexible sails may experience a stronger drag force than solid ones with effective drag coefficients increasing from 2.3 up to 2.8. In both versions, the sails can fold down when impinged by a water jet at their back. As tidal flow changes into reverse direction, the device – which is of mirror anti-symmetric shape - can be rotated by 180° about its long axis so as to continue its operation. A prototype has been constructed demonstrating this effect. A further design foresees that the device could operate in forward and reverse tidal flow without rotation, whereby in one direction the upper sails fold down, while in the reverse direction the lower ones. The theoretically estimated maximum power deliverable by one of the constructed prototypes is about 300 W for 2.0 m/s of water flow.

Awards Won: