

A new Colloidal cybernetic sysTem towaRds 2030

THE PROJECT

CogITOR represents a novel approach to cybernetics, proposing the study of Colloidal (liquid) Cybernetic Systems (CCS), a multifunctional liquid-based platform that we have designed to be capable of pressure sensing (i), computing and data storage (ii), energy harvesting (iii) and integrating fully custom electronics (iv). A CCS provides operation in extreme environments by definition, having distributed architecture (homogeneous liquid plus random network architecture), being fault-tolerant and featuring self-healing capabilities. Within COGITOR in 48 months the consortium will provide a platform where liquid electronics efforts can converge from all over the world, making European research the point of reference for this big step forward. COGITOR measurable and specific objectives are: i) creating an impedance liquid state pressure sensor with spatial and temporal resolution; ii) producing an holonomic reversible memory written/erased electrically and read by tomographic Microwave Impedance Spectroscopy; the electrical operation will be used to implement learning (both sequential and concurrent) and calculation, where the system acts as a

The project will create a liquid robot. It will "feel" the external environment like our skin, being sensible to pressure and temperature. It will be able to heal autonomously when wounded. A basic liquid memory and a rudimentary logic will be implemented. It will produce a small amount of energy to "be alive".

OBJECTIVES

Studying liquid robots will impact our understanding of living systems, including cells: their intelligence, autonomy, adaptability, self-repair aspects will be explored. The exploration of difficult environments, including outer space, gas giants such as Jupiter, small bodies such as comets and asteroids, will be impacted by our outcomes. We also expect to impact electronics and computer science!



The benefits of a base science research are for all the people. Inspiring new forms of art, of understanding, of conceiving a robot are among the expected benefits. The consortium will boost the European position in soft robotics and grant supremacy in liquid robotics.





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