

# **HYDROMEL - Hybrid ultra precision manufacturing based on positional and self-assembly**

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## **Abstract**

The integrated project HYDROMEL aims at developing a technology platform for new versatile 3D ultra precise automated production systems. Manufacturing of complex micro-devices is targeted. Based on ultra precision robots improved by the innovative knowledge-based self-assembly technology, this groundbreaking combination will participate in the massive production of high-added value strategic and emerging micro-products.

The combination of positional assembly - where objects are mechanically manipulated and positioned one by one - and self-assembly (autonomous organization of components into patterns or structures without human intervention) – where objects arrange themselves into ordered structures by physical or chemical interactions- offers a new and flexible production concept permitting the development of a fully innovating hybrid automated tool for assembly of micro-products at an industrial scale.

Thanks to the flexibility of the process, HYDROMEL will be capable of meeting requirements in wide range of applications and, as a consequence, dynamize existing markets and open new ones to generate employment. Increase of European competitiveness in the following strategic markets will be targeted: mechanics, electronics, biological engineering, microfluidics and IT.

Relying on the latest scientific developments in robotics and self-assembly, HYDROMEL's academic, R&D and industrial partners will enable the availability of a hybrid/self-assembly technology in Europe at an industrial scale. The innovative approach will push Europe as leader in the field of high added value micro-products manufacturing.

HYDROMEL is an integrated European project with 22 contributing partners. The FP6 project started in October 2006 and lasts 48 months. Having passed the mid-term event end of the last year important milestones have been reached. A variety of systems and tools for high-precision robotics have been developed. Those will be combined with self-assembly mechanisms. Different self-alignment principles have been developed based on switchable surface or hierarchical self-assembly. A proof of concept of the technologies has been achieved. The upcoming project phase will focus on industrialization of the technologies and on demonstration of their benefit in selected demonstrator setups.