

[VOILES | SAILS]

Self-Assembling Intelligent Lighter-than-air Structures

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Abstract

Through the use of flying automata (aerobots), the [VOILES | SAILS] project aims to port to the physical world some of the functionalities observed in artificial life systems, with a particular focus on simulations of assemblages and behaviours derived from the observation of animal societies (coral reefs, anthills) that can collectively produce high performance structures with extremely limited abilities at the individual level. It involves a swarm of cubic robotic blimps floating in a large indoor space. Four aerobots (one 180 cm prototype and three 170 cm beta versions), equipped with sensors, ducted fans, wireless communication and a 40 g fully functional UNIX computer, are currently flying. The current phase of the project aims

to implement 6 to 12 self-organising cubic aerobots evolving in a semi-spherical indoor space within which an immersive environment will be generated through the use of a 360 degrees panoscopic projector. The cubes will interact between themselves, and to the local temperature, colour and luminosity conditions within the sphere; complex structures and behaviours will emerge from these interactions, creating flying architectonic structures for which we coined the term aerostatiles, in reference to Calder's mobiles and stabiles.