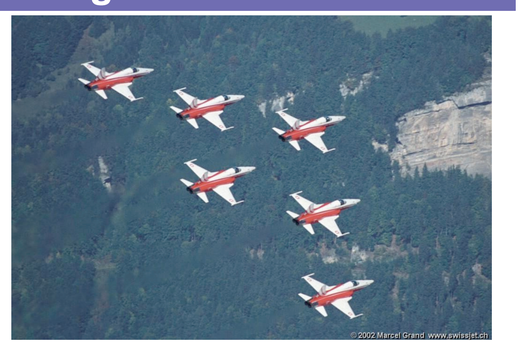
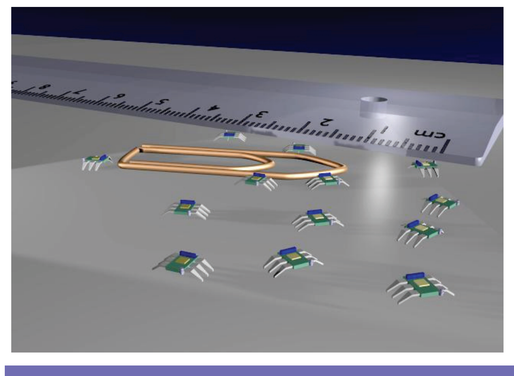
Intelligent Multi-Agent Formations and Networks

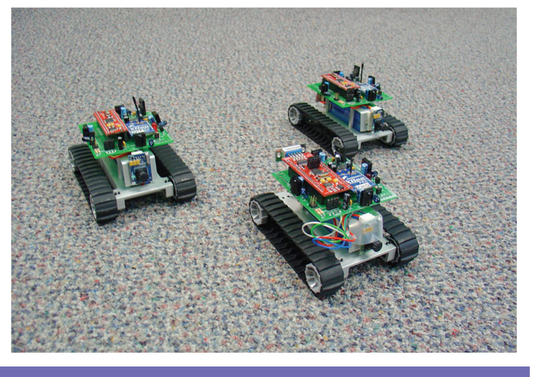
Staff: B.D.O. Anderson, B. Fidan, G. Mao, C. Yu
Students: I. Shames, X. Ta , T. Summers, A. Kannan, X. Hou, Y. Ji, S. C. Ng

Problems: Find distributed control laws to maintain the shape of multi-agent formations; and develop target localisation techniques using these agents.

Natural and Artificial Multi-Agent Formations







Distributed Control Laws

What's Under the Hood

- Distributed control laws for agents to take up and maintain geometric shapes and perform tasks like collision avoidance, handling agent loss, localisation
- Measure ability of a formation to perform a specific function, sustain (random) component failure; give design methods to improve such ability
- Investigate impact of formation geometry on localisation including specific localisation techniques for DSTO scenarios
- Graph theory based.

At a Glance

- We deal with specific problems posed by Defence Science and Technology Organisation (DSTO) and work collaboratively with them
- Problems involve unmanned airborne vehicle formations and target localisation
- Wider applications include: environmental monitoring, health monitoring, vehicular networks, road safety and road traffic control, wireless communication and positioning.

Looking Ahead

- Coping with dense target environments
- Collaborative development of special purpose hardware for emitter deinterleaving
- Fundamental research on connectivity of multi-agent networks.

Main Institutions: NICTA, DSTO, Australian National U., Sydney U.

Collaborating Institutions: U. of South Australia, Deakin U., Australia; Catholic U. of Louvain, Belgium; U. of Tokyo, Japan; Yale U., U. of Iowa, U. of California - Santa Barbara, U. of California - San Diego, U.S.A.