

12th IAA SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FUTURE (D4)  
Innovative Concepts and Technologies (1)

## ROLE OF SMART SMALL SPACECRAFT SWARMS IN COMMERCIAL SPACE APPLICATIONS

**Abstract**

This paper discusses the potential that small spacecraft can play in the commercial space industry as a collective or swarm that are 'smart' for space missions. 'Smart' here, is associated with swarm behaviours such as swarm intelligence and self-organisation. The paper will discuss the currently possible multi-use technology (both in use and under development) as well as focusing on current key players in the small spacecraft industry and will critically analyse their mission goals with its commercial, economic and technological viability. It will additionally analyse trends in the space industry that are promoting development of small spacecraft and the needs of many wider industries that these small spacecraft can meet. It will also draw comparisons on UAV swarm behaviour and analyse the potential of using this development environment for pursuing spacecraft swarm activities. Finally the paper will critically assess whether the potential and capability development in spacecraft swarm technology can meet earth observation and other multi-use needs and still be profitable. To this end, the paper will provide a holistic summary of swarm spacecraft capability as well as trends for future development and the cost benefits that will come from multi-use potential of swarms.