

## 20th SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)

## Access to Space for Small Satellite Missions (5)

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## LAUNCHING NANOSATS AFFORDABLY, PROBLEMS AND SOLUTIONS

**Abstract**

As many CubeSat builders have discovered, the cost of launching satellites under 50kg are increasingly dominated, as their mass decreases by other factors than the bare pro-rata launcher costs. Recent attempts to alleviate the effect of these factors (chiefly administration and regulatory) by launching in 'swarms' such as the QB50 project are subjected to complicating factors of their own, such as the timely integration and deployment of the satellites into a single dispenser, particularly if these are sourced from diverse experimenter-suppliers. Out of the many satellite launchers that CST has brokered and managed, four were under 50kg: 3 CubeSats and the 6kg SSTL 'Snap'. The costs of these launches were made manageable by the amalgamation of their launch service agreements (LSAs) with those of SSTL satellites on the same launcher. This method has been employed for the UK Space Agency 3 unit CubeSat, 'UKube', by combining its LSA with that of the BIS 'Tech Demo Sat'. ISIS – Innovative Solutions In Space BV is a launch service broker for nanosatellites more specifically, with more than 20 of such satellites already manifested or launched. ISIS is already working on highly integrated deployment systems for multiple nanosatellites at the same time, varying from 4 satellites up to the swarm of 50 for the QB50 mission. By combining economising administrative techniques, the right groupings of satellites and simplifying their integration, CST, SSTL and ISIS jointly consider the possibility to control the costs of launching very small satellites to a level acceptable to commercial if not university users. The paper discusses the cost reduction methods and their utility in future projects.