

EARTH OBSERVATION SYMPOSIUM (B1)  
Future Earth Observation Systems (2)

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A CONCEPT OF FORMATION FLYING EARTH OBSERVATION SYSTEM DEMONSTRATION  
MISSION

**Abstract**

An extensive survey of multi satellite missions utilizing small satellites was performed. The analysis focused on application of satellite constellations, formation flying, fractionated spacecraft and federated satellite systems. From the survey stems the idea of using formation flying techniques to enhance the capabilities of Earth Observation satellites. It propose that to a main (existing) EO satellite an additional formation flying satellite is added. The additional satellite flies over the same ground track ahead of the main satellite with specified separation. The satellite leading the formation provides a coarse measurement, used for on orbit selection of observation target for the main satellite. The concept was first presented in 2016 during the 4th International Federated and Fractionated Satellite Systems Workshop and since then it was further elaborated. In the paper a demonstration mission aimed to prove the feasibility of the concept is presented. The system requirements and a preliminary design of a demonstration mission utilizing two nanosatellite CubeSats will be explained. Each CubeSat would be equipped with EO payload, first with large and second with small field of view. An orbital configuration will be discussed with appropriate attitude and orbit control system, EO payload and satellite link scenarios. The proposed concept is now validated by simulation and seems to be suitable for possible practical implementation.