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# A FRACTIONATED SATELLITE APPROACH TO COASTAL SALINITY MEASUREMENT

**Abstract**

Coastal salinity is characterized by large and variable salinity contrasts on relatively small scales. Measurements of salinity at a resolution compatible with these coastal regions on a regular basis would provide a rich source of information that could be used for a number of applications that have a fundamental bearing on the world's lifestyle. This paper describes an approach to measuring coastal salinity using the concept of fractionated satellites. The Fractionated concept, developed by Owen Brown and Paul Eremenko of DARPA, uses physical decomposition of the spacecraft and information integration to achieve a space system that is much more flexible and adaptable than its monolithic equivalent. SMOS, the current ESA mission to measure sea surface salinity, already utilises information integration at a payload level to combine the information from the individual receiving antennas to form the image onboard the spacecraft, before it is transmitted to the ground. A coastal salinity measurement system that requires physical decomposition of the payload and information integration at a payload level, will improve the flexibility and reliability of the system. This presents significant challenges in terms of the data handling, onboard computing and communications architectures employed as well as the orbits employed by the individual free flying modules and the accuracy to which they are maintained. These will be discussed in this paper. We present some initial results from a concept exploration for a space system to measure coastal salinity, utilising the concepts outlined above. A major trade off performed concerned the reduction of the number of free flying payload satellites in order to reduce the complexity of the formation flying aspects of the system.