

25th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Small Earth Observation Missions (4)

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SMALL SATELLITE TO MONITOR THE RED TIDE BLOOMING ON CENTRAL AMERICAN
COAST USING A HIGH DEFINITION CAMERA AND TWO MULTISPECTRAL CAMERAS

Abstract

Reti-Sat is a microsatellite mission, consists of one Earth observation micro-satellite (with the intention to make it scalable) to monitor the Central American region territorial sea, in order to detect and predict the occurrence of red tides, and to provide this information to the corresponding authorities in each country. The satellite has been totally designed by students, and includes a high definition camera and two multispectral cameras to monitor the color and the temperature of the sea surface as the scientific payload, and include the ADCS system, electrical system and all the requirement components to make the satellite work properly. The space mission consists not only of the satellite by itself, it would also require a ground base station network to support the communication with the space segment. The images obtained by RETI-SAT will be given to the Sea and Limnology Research Center (CIMAR, of the University of Costa Rica) for further analysis. The data will be used to predict and monitor the proliferation of dinoflagellates that causes red tides. Once the CIMAR identify this proliferation, the information will be sent to the local government in order to take the necessary considerations to mitigate the negative effects of this phenomenon in the local production sector. Maritime resources are a primary source of food in Costa Rica, as well it has an important role on the country and region economy. The effects produced by the proliferation of this type of algae have severe consequences on the health of the marine, terrestrial ecosystem and even the human being. Red tides have repeatedly impacted incomes from the mollusk trade, income from tourist arrivals and several people have been reported as poisoned due to the intake of contaminated products. The economic issues effects experienced by the region due to this problem justify the need to seek a solution to the delayed capacity that currently is available to predict

this type of problems. RETI-SAT becomes a solution that uses outer space as a useful and fast resource. The development of this type of initiatives is not only a great opportunity for educational development for Costa Rica, but it is also a solution that adapts to the needs of the country and to the 17 Sustainable Developments exposed by the United Nations. The Costa Rican government has decided to focus, as one of the critical areas of national significance, the development of environmental protection.