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PROPOSAL OF A SMALL SATELLITE CONSTELLATION FOR REMOTE SENSING OF RED TIDE
AND ITS POTENTIAL IMPACT ON THE LOCAL ECONOMY OF COSTA RICA.

Abstract

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Like many other developing countries, Costa Rica has suffered diverse environmental problems for the last decades due to the impact of global warming and the development of new sectors of the economy. Despite Costa Rica accounts for only 0.03% of the earth's surface, it contains nearly 6% of the world's biodiversity; which represents a challenge in terms of the environmental sustainability of the region. Recently, the red tide phenomenon has shown an increase, which represents a negative impact not only in coastal regions in Costa Rica but even in remote regions of the country due to the economic repercussions; including expenses in beach clean-ups, tourism-related losses, and medical expenses. Although this is particularly problematic in the Caribbean region, the harmful algal bloom has also been found on other coasts; for example, the Persian Gulf, the Japanese sea, among others. Earth observation missions have been used to mitigate the impact of this type of phenomenon by revealing the outbreak and evolution of the red tide event. However, is hard for developing nations without a real aerospace infrastructure to have access and control of such kinds of missions. This paper address the proposal of an accessible and reliable remote sensing mission consisting of a constellation of small spacecraft. Between other advantages, a constellation has higher reliability since the potential malfunction of one spacecraft from the constellation does not lead to a total mission failure.

Keywords: spacecraft, remote sensing, red tide, satellite constellations, infrared sensors, orbit parameters, mission development.