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DESIGN OF A CONSTELLATION OF SMALL SYNTHETIC APERTURE RADAR (SAR) SATELLITES IN PERU.

Abstract

In recent years, synthetic aperture systems have become very useful for earth observation missions, since small satellites that can carry these radar sensors are an attractive economic option compared to the usual satellite platforms. The article presents the design of a constellation of small satellites to meet the earth observation needs of the Peruvian market. In the Peruvian market, satellite images are demanded and used for various applications; one of the main ones is the prevention of natural disasters such as landslides; however, the climate of Peru limits the ability to study with optical sensors for this reason SAR sensors present a good alternative for its application in this territory. Therefore, the work details the design of a constellation of two 12U small SAR satellites to cover the demand for satellite images in the national market.

First, the Peruvian context was studied according to the needs of the interested institutions and in accordance with the National Strategic Development Plan; then the technological solutions that cover this demand were studied; then the technological solution of a satellite constellation was proposed and consequently the design of this constellation of small satellites was carried out.

From the design we obtained simulations of the orbit of these satellite missions, observation parameters of the satellite sensors, characteristics of the antenna and communication windows, and we also presented how much the budget of this project would be. Finally, the constellation of small satellites offers an opportunity to obtain usable images, at low cost, compared to expensive earth observation satellites and presents a viable option to be acquired by different institutions in Peru that are interested in obtaining these satellite data. Additionally, this project would allow for the continuity of Peru's satellite development and its continued inclusion in the space value chain.