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Author: Mr. João Victor Moreira
University of Brasilia, Brazil

Prof.Dr. William Silva
University of Brasilia, Brazil
Dr. Chantal Cappelletti
University of Nottingham, United Kingdom
Dr. Renato Borges
University of Brasilia, Brazil
Prof.Dr. Oleg Yakimenko
Naval Postgraduate School, United States
Mr. Gabriel Yamato
Brazil
Mr. Diego Rangel
Naval Postgraduate School, Brazil
Mr. Gustavo Malta
Universidade de Brasília, Brazil
Mr. Alejandro Lopez
Universidade de Brasília, Brazil
Mr. Filipe Nunes
University of Brasilia, Brazil

ARARA CONSTELLATION: A CUBESAT CONSTELLATION FOR MONITORING THE BLUE AMAZON

Abstract

In recent years, CubeSats have emerged as versatile platforms for various space missions, offering affordability and flexibility. These small satellites, often the size of a shoebox, have demonstrated utility in applications ranging from communications to remote sensing. They can work collectively, forming constellations, to enhance efficiency and coverage, particularly in Earth observation, including military applications.

Brazil, ranking as the fifth-largest country globally, faces challenges in safeguarding its extensive coastal borders. To address potential threats and enhance maritime security awareness, Brazil has designated its jurisdictional waters as the Blue Amazon and implemented the Blue Amazon Management System (SisGAAz). This system serves as a vital tool for monitoring and managing the maritime domain, ensuring the protection of valuable marine resources and addressing security concerns.

This article proposes a constellation of optical CubeSats as a supplementary tool for the Brazilian Navy as part of the SisGAAz program. Our analysis, utilizing the STK (System Tool Kit) software, focuses on configuring orbital parameters to optimize coverage over the Blue Amazon. Specifically, we investigate the Walker-Delta configuration and conduct trade-off studies to meet the constellation's mission requirements.

The results of this study will provide information on the feasibility and effectiveness of using CubeSats for tactical applications by the Brazilian Navy, improving surveillance capabilities in safeguarding Brazil's jurisdictional waters and coastal borders.