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EVALUATING THE POTENTIALS OF AN INTERNATIONAL COLLABORATION BETWEEN
EQUATORIAL NATIONS BY IMPLEMENTING A CONSTELLATION OF INTERFEROMETRIC
SMALL SAR SATELLITE NETWORK

Abstract

This paper cross examines countries within the Equatorial Region, with the aim of highlighting the setbacks and advantages of exploiting an international collaboration based on sharing resources for implementing a small SAR network. This analysis is unfolded in three stages. The first stage discusses developing nations and their various levels of space capability. Their capability posits a path through five main technological competencies, as follows: 1) owning and operating a satellite; 2) design and building a satellite; 3) having an astronaut; 4) capable of sounding rockets; 5) having the capability to recover biological sounding rockets. The second stage discusses developing nations geographically located between 10 degrees of the Equator and their specific space capabilities. The results provide information about the similarities and differences in the space technology utilised and the requirements that drove their choice of selection. The third stage is a discussion on the similar issues experienced within the Equatorial Region regarding natural disaster, man-made and environmental disaster, criminal activities, border security and resource monitoring. It also explores the countries' diverse strategies of managing these issues with a view to drawing inference on the effectiveness of these strategies. The fourth stage proposes the use of a constellation of small SAR satellites capable of interferometric operations in a low Earth near-equatorial orbit. A brief description of the orbit constellation and satellite configuration is provided. Then a few attractive application areas for the SAR constellation are highlighted and results on coverage and temporal resolution is presented. Finally, a design value for the data downlink rate and the daily data volume that can potentially be downlinked to selected ground station sites will be presented. This inevitably leads to discussing the benefits of implementing an international collaboration between countries within the Equatorial Region from a technological perspective as a strategy of addressing previously mentioned issues.