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CONCEPTUAL DESIGN OF A COMMUNICATION NANOSATELLITE MODEL WITH A NEW
GENERATION LASER BEAM CONTROL AND ACTIVE TRANSPONDER SYSTEM**Abstract**

This research delves into the conceptual design of a Nanosatellite model with a new generation laser beam control and active transponder system, focusing on the initial conceptual model of this new system which combines the advantages of radiofrequency communication (RF) and optical communication (OC) on CubeSat satellite platforms. The aim of the research is to verify the feasibility and effectiveness of the proposed Nanosatellite model and highlight the advantages of this technology, demonstrating its potential for effective use to improve the performance of CubeSat platforms.

The research encompasses the electrical electronics, RF and OC communications, mechanical functional structure scheme and models, with its working principles, software algorithms and data handling solutions, intersatellite link mission, and simulation analyses with both RF and OC communications. The results of the study provide valuable insights into the advantages of this new technology and its potential to improve the performance and efficiency of CubeSat satellites, with a comparison of the performance of RF and OC systems in CubeSat platforms.

In conclusion, this research presents a comprehensive study of the initial conceptual design of a Nanosatellite model with a new generation laser beam control and active transponder system. The results of the study demonstrate the potential of this technology to improve the communication and information exchange subsystems in the space sector, with implications for telecommunications, navigation, and remote sensing, among others. The research highlights the need for continued research and development processes to meet the main technical requirements of CubeSat platforms, especially in light of the increase in the volume of data required for space communication and the limitations faced by current radiofrequency communication systems.