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PHONE STATIONS: EMPOWERING SECONDARY EDUCATION THROUGH LOW-COST GROUND STATIONS ON SMARTPHONES

Abstract

Smartphones have become an indispensable tool for communication and accessing information, with over half of the world's population owning one. The integration of new technologies into these devices has opened up a wide range of possibilities. In this way, the implementation of ground stations in cell phones for academic purposes may be a new upgrade.

Ground stations allow communication with satellites, and this integration can provide students with real-time access to satellite data. Hence, this project provides low-cost opportunities for academic institutions in underdeveloped countries. These countries often face challenges in developing their aerospace industry, due to a lack of funding and resources. By introducing this technology into the classroom, students can gain practical knowledge and skills that will allow them to contribute to the development of their country's aerospace industry. Additionally, this project can engage students in STEM fields, providing them with practical skills and knowledge that will be invaluable in their future careers.

In this way, this paper proposes the use of only four hardware elements: an Android device (mobile phone), an SDR Dongle, an OTG cable, and an antenna, to implement a "phone station" (PS). The Android device and the SDR dongle fulfill the role of reception, which refers to demodulation, decoding, down-converting, amplifying, and others. The SDR's complementary software is designed to be installed on the android device and to offer a fast mobile-based Digital Signal Processing application. At last, the OTG cable connects these tools and the antenna aids in the reception of signals.

Additionally, a public access satellite network (PASN) is proposed to provide spatial data to those academic organizations implementing this PS. This PASN could be designed and financed by the conglomeration of countries interested in participating in this project. Likewise, the PASN is intended to collect a great variety of data from space and contribute to academic research, studies, and projects.

In conclusion, the integration of ground stations into smartphones for academic purposes contributes to the development of underdeveloped countries, pushing their aerospace industry. The use of low-cost hardware elements makes it an accessible and affordable option for them. Additionally, the proposal of a public access satellite network can contribute to academic research and studies in this field. Overall, this project has the potential to inspire and encourage students to pursue careers in the aerospace industry and space area.