

U of K Small Satellite Mission Impact on Sudan Development and Its Role in Sudanese Engineers Capacity Building

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UofK Cubesat Project:

In 2011, a Cubesat project was established in the Department of Electrical and Electronic Engineering, Faculty of Engineering at University of Khartoum.

It was the first educational project in the field of space generally and specially in Satellites field in

Sudan. The main target was to get involved in this field and then start capacity building and raise the awareness about the space and satellites.

The university started to assign the engineers and researchers from different specializations, who had the intensive interest to add value for this project and who got the real intention to make something unique.

The figure shows the Cubesat prototype that designed, implemented and fabricated in the university.



UofK Educational Ground Station:

A professional educational ground station was installed and till now operating by the university engineers and undergrad students. It succeeds to track many universities Cubesats and small- satellites and also succeed to send commands and receive data from different types of satellites that are active in its orbit. The University of Khartoum educational ground station doesn't focus only on tracking and commanding the educational small satellites or Cubesat, it also used in tracking and receiving data from other types of application satellites. After receiving the data, the ground station engineers decode this received information using the ground station decoding programs and then analyze and study the result.



UofK Space Research Center Vision :

- Provide the space technologies experiences for all researchers and technician and developing their skills.
- Get the hand-on experience in the field of space technologies.
- Support and develop the multi disciplinary field and researches which related to the space science and technologies.
- Prepare the strategic studies which related to space science and technologies and also the studies which related to the country development such as the agriculture fields, weather, remote sensing and the environments.

UofK Space Research Center roles in public awareness:

Since the establishment of the Cubesat project, and then the Space research Center, there were periodically workshops and training sessions presented by the space center researchers for the interested university students and young professionals to make them aware about the newest technologies and ideas in the field of space and satellites (specially the small satellite), even the high school students were involved in these workshops and training sessions.

Also many events and competitions related to educational satellites were organized and sponsored by the Space Research Center. The goals of all these events is to spread the awareness of the space and satellites benefits and effectiveness on our daily life and also to illustrate that, the small and educational satellite can do missions and collect useful data same as the professional satellites.

Space Research Center Impact on Sudanese Engineers Development :

Every year, numbers of interested researchers from different disciplines and specialization join the space research center. Nowadays, and in order to accomplish and achieve the target mission of the University small satellite to serve the agricultures in Sudan, the space research center has communication, electronics, power, control, software, mechanical engineers. Those engineers are working in the both sections, the educational ground station and also the designing of the UofK Small-sat.

The communication engineers deal with the different types of antennas and modulations techniques, transceivers and how they can send and receive the data from the ground stations. Software engineers deal with the decoding and tracking programs and with the on-board computer subsystems. Electronics engineers deal with the antenna tracking system calibration and measurements and with different types of electronic circuits.

Power engineers deal with power system for all devices and system in the ground station and on the Small-Sat subsystems. Control engineers deal with the mechanism of antenna rotator control and also the design of the attitude control for the Small-Sat and the mechanical engineers deal with the mechanical parts of antennas and rotator control and also responsible of the process of manufacturing and fabricating the spacecraft body and skeletons.

This diversity in specialization and the nature of tasks that required to install and operate small satellite educational ground station and also the knowledge need to designed and implement a fully functional Small-Sat affect directly in the human capacity building in the field of space and satellite science and technologies here in Sudan.