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## PROSPECTS AND CHALLENGES OF NIGERIA VENTURING INTO DEEP SPACE EXPLORATION

### Abstract

Nigeria's space programme development has recorded great successes with over a decade of active participation in the space enterprise, having launched four satellites into orbit between 2003 and 2011. Three out of these four satellites, NigeriaSat-2, NigeriaSat-X and NigComSat-1R, are still functioning, sending data to the Earth's ground stations from outer space. In addition, the Nigerian Space Research and Development Agency (NASRDA) has developed a critical mass of scientists, engineers, astrophysicists and lawyers by training and re-training over 400 and 150 staff at the MSc. and PhD. degree levels respectively. Significant collaborations between NASRDA and many government agencies/institutions in charge of security, communication technology, education, astronomy and environment have been recorded. The Federal University of Technology, Akure (FUTA), Ondo state, Nigeria, through its Centre for Space Research and Applications (CESRA), has contributed to the efforts of NASRDA by launching a Cubesat, NigeriaEduSat-1, through its collaboration with Kyushu Institute of Technology, Japan in a Joint Global Multi-Nation Bird (JGMNB) project. In addition, Nigeria through several cutting edge research and studies, has established itself as a hub for global astronomy which has encouraged the study of the universe: sun, moon, stars, planets, comets, gas, galaxies, etc. A surprising revelation is that, among the old and recent writings in Nigeria are several works on Astronomy such as Northern Nigeria's rich astronomical heritage and the efforts of some tertiary institutions, such as the University of Nigeria Nsukka, Obafemi Awolowo University, Ile-Ife and FUTA, which now awards degrees and carry out researches in Astronomy, Astrophysics and Communication Physics. Three activity Centres of NASRDA, viz: Centre for Basic Space Science (CBSS), Centre for Space Science and Technology Education (CSSTE), and Centre for Atmospheric Research (CAR) are actively involved in trainings and researches in space science. As part of the Road Map to Nigeria's space mission and a drive towards deep space exploration, NASRDA announced plans to send an astronaut into space by year 2030, a development that has stimulated interest in Space Education and Outreach Workshops, organized by CSSTE and FUTA at various levels of education and in different parts of the country. The participation of some secondary school students in the zero-gravity flight at the Kennedy Space Centre in Florida was further used as stimuli to encourage the learning of Science, Technology, Engineering and Mathematics (STEM) at the primary and secondary levels of education in Nigeria towards the development of future astronomers and astronauts. Similarly, the fall of a meteorite, weighing 80 kg, in Sagbama village NW Nigeria in 1962, presumably to have originated from Planet Mars, stimulated FUTA's space club in participating in the first global Asteroid Search Campaign in 2016. Based on the success of the launch of NigeriaEduSat-1, FUTA and NASRDA have demonstrated the capacity, through international cooperation, of building cubesats/smallsats which can perform close flyby encounters to diverse kinds of NEOs or asteroids.