IAF EARTH OBSERVATION SYMPOSIUM (B1)
Interactive Presentations - IAF EARTH OBSERVATION SYMPOSIUM (IP)

Author: Mr. Victor Mukungunugwa
Kyushu Institute of Technology, Zimbabwe

Mr. Timothy Kuhamba
LaSEINE, Kyushu Institute of Technology, Zimbabwe
Mr. Painos Gweme
Kyushu Institue of Technology, Zimbabwe

# ZIMBABWE'S LONG-TERM EARTH OBSERVATION MISSIONS FOR THE ACHIEVEMENT OF A SUSTAINABLE SOCIO-ECONOMIC ENVIRONMENT USING NANOSATELLITES

**Abstract**

Over the past years, the livelihoods of the people of Zimbabwe have been ravaged by various environmental problems some related to climate change. Flooding, landslides, and drought, human effects, have plundered Zimbabwe leading to loss of life, poor harvest famine, destruction of property, water pollution, etc. A space capability plays a pivotal role in the early detection of such harsh weather, disaster monitoring, mitigation, and control. The lack of data-gathering tools to quantify the depth of damage due to these effects makes it challenging to distribute relief to the point of need. This has caused a great impact on the economy moreover; Zimbabwe's economy is agriculturally based, and it is of paramount importance to foster agriculture through the implementation of viable technologies for strategic planning and decision-making. Zimbabwe covers a total area of 390 000Km2 making it difficult to survey using ground-based equipment, the circumventing of these problems heavily depends on space technologies. In the quest to solve existing problems, Zimbabwe through the Zimbabwe National Geospatial and Space Agency (ZINGSA), made a leap in the space fraternity by developing its first satellite (ZIMSAT-1) in collaboration with the Kyushu Institute of Technology under the BIRDS 5 Project.ZIMSAT-1 was launched on 2 December 2022 and is operating in a constellation of 3 satellites housing multispectral cameras with four different spectral bands. The satellites will conduct land use and cover, water quality assessments, and drought prediction. Additionally a data relaying capability for weather, flooding and landslide monitoring, solar illumination, etc. The obtained data in a long term will be used for strategic planning and decision-making, limiting government expenditure in both favorable and hostile weather. Furthermore, the ZIMSAT-1 has provided huge lessons learned for ZIMSAT-2, the second satellite that is already under development. This paper illustrates how Zimbabwe through space technologies, combats climate change to support sustainable economic, social, and environmental development. Moreover, it outlines the lessons learned from the ZIMSAT-1 satellite that is already in orbit.

Note: I withdrew this paper from Gloc 2023 and the paper code was GLOC-2023,T,3C,x75361