

23rd IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
17th Workshop on Small Satellite Programmes at the Service of Developing Countries (1)

Author: Ms. Kelly Antonini
Technische Universität München, Germany, kelly.antonini@tum.de

Mr. Martin Langer
Technische Universität München, Germany, martin.langer@tum.de

Mr. Ahmed Farid
Telespazio VEGA Deutschland GmbH, Germany, ahmed.farid@dlr.de

Prof. Ulrich Walter
Technical University of Munich, Germany, u.walter@lrt.mw.tum.de

SWEET CUBESAT – WATER DETECTION AND WATER QUALITY MONITORING FOR THE 21ST
CENTURY

Abstract

Water scarcity and contamination of clean water have been identified as major challenges of the 21st century, in particular for developing countries. According to the International Water Management Institute, about 30 percent of the world's population does not have reliable access to clean water. Consequently, contaminated water contributes to the death of about 3 million people every year, mostly children. Access to potable water has been proven to boost education, equality and health, reduce hunger, as well as help the economy of the developing world. Currently used in-situ water monitoring techniques are sparse, and often difficult to execute. Space based instruments will help to overcome these challenges by providing means for water level and water quality monitoring of medium-to-large sweet water reservoirs. Data from hyperspectral imaging instruments on past and present governmental missions, such as Envisat and Aqua, has been used for this purpose. However, the high cost of large multi-purpose space vessels, and the lack of dedicated missions limits the continuous monitoring of inland and coastal water quality. The CubeSat mission SWEET (Sweet Water Earth Education Technologies) will try to fill this gap. SWEET is a joint effort between the Technical University of Munich, the German Space Operations Center and the African Steering Committee of the IAF. By using a novel Fabry-Perot interferometer based hyperspectral imager, the mission will deliver critical data directly to national water resource centres in Africa with an unmatched cost per pixel ratio and high temporal resolution. Additionally, SWEET will incorporate education of students in CubeSat design, and water management. Although the aim of the mission is to deliver local water quality and water level data to African countries, further coverage could be achieved with subsequent satellites. Finally, a constellation of SWEET-like CubeSats would extend the coverage to the whole planet, delivering daily data to ensure reliable access to clean water for millions of people worldwide.