

EARTH OBSERVATION SYMPOSIUM (B1)
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OUR WORLD NEEDS SPACE TO SOLVE THE GLOBAL WATER CRISIS - PRACTICAL
APPLICATION OF RAPIDEYE IMAGERY

Abstract

The global water crisis is the immediate threat of the inability to provide a reliable supply of potable water to regional populations around the world. Humanity's negative impact on the worldwide fresh water supply is a result of increased population, climate change, intensified agriculture, and economic growth. To address this problem, governments, corporations and other concerned parties need to develop long term strategies with targeted local and global planning. Remote sensing satellites can provide large scale data that is needed to facilitate the development of water management strategies. However, intermittent observations are not useful for this issue. Continuous data is needed to both assess the current state of the water crisis, and to monitor the effectiveness of implemented action plans. This leads to specific operational capability requirements of the remote sensing satellite system relating to coverage, spatial, temporal and spectral resolutions.

With its combination of high spatial resolution and short revisit times, BlackBridge's 5 satellite RapidEye constellation facilitates timely monitoring of water crisis issues of agriculture, environment, and forestry. BlackBridge operates this end-to-end commercial Earth observation system using a dedicated spacecraft control center (SCC), reception facilities for enabling uplink/downlink services, and a ground segment designed to plan, acquire, and process over 5 million km of imagery every day. These satellites operate in a sun-synchronous low Earth orbit and have been operational for more than five years.

This paper presents an overview of the in-house analytical techniques developed at BlackBridge that use RapidEye imagery for grassland classification, precision agriculture information products, and water monitoring. Grasslands cover vast areas and its degradation is connected closely with ecological challenges such as desertification and water pollution. Water quality is directly affected by grassland degradation when soil erosion and nutrient runoff from agricultural areas increase due to loss of its natural filter capacities. Frequently updated land cover information is needed for environmental monitoring and can be generated based on RapidEye imagery. Additionally, BlackBridge provides agricultural information products about in-field heterogeneities to enable site specific farm management, which helps reducing nutrient and pesticide application and consequently water pollution. Nutrient runoff is leading to eutrophication of water bodies which makes assessment and monitoring of water quality necessary for water resource management. Multi-spectral information of RapidEye sensor is suitable to estimate chlorophyll content as an indicator for phytoplankton biomass. These developments serve to empower water resource management decisions