Paper ID: 73080
oral

IAF SYMPOSIUM ON INTEGRATED APPLICATIONS (B5)
Satellite Commercial Applications (3)

Author: Mr. Alexandre Carayon
China Head Aerospace Technology Co., France

Ms. Wei Sun
China HEAD Aerospace Technology Co., United Kingdom

SATELLITE BASED NIGHT IMAGE: NEW APPLICATIONS BRINGING SOCIAL ECONOMIC BENEFITS FROM SPACE

Abstract

The paper will present how we can use current operational space-based technology to provide night imagery collected by a constellation of 9 satellites for various applications such as light pollution or streetlight monitoring. Such applications by using space technology is bring social economic benefits for users to better manage the country's infrastructure as well as urbanization management.

The harm caused by artificial light on human and wildlife gradually is the subject of many studies. The intensity of light pollution has a certain impact on the incidence of diseases, wildlife behavior changes and ecosystems degradation. Also, public services are looking forward to make more efficient the public illumination and to reduce it in useless situations. Among the research methods of light pollution, ground-based surveys, drone-based surveys and satellite-based surveys have their own advantages. Among them, satellite-based surveys as the NightVision constellation can carry out light pollution distribution surveys in urban-level space. This research developed a method to perform a light pollution mapping and defined indicators for reporting and monitoring measures to reduce light pollution using NightVision data.

The Jilin-1 NightVision Video, Very High Resolution (VHR) at 0.92m GSD constellation is developed by Chang Guang Satellite Technology Ltd. of China and is commercialized by HEAD. This constellation consists of ten satellites, in which the first 210 kg JL1-SP launched in October 2015. Six more JL1-SP satellites (JL1-SP03,04,05,06,07,08) were launched in 2017. The constellation expanded in 2020 with a new generation of three small satellites (42 kg) satellites (JL1-GF03C-01,02,03). All offering day night imaging and video from space with a revisit of 3 times/night or day. It is the only commercial constellation that provides multiple imaging modes (Video, Night-time/ inertial, space, push-broom image mode)

The benefits found in this method are the identification of public and private sources and the prioritization of sources according to their emissions seen from the sky, or the proportion of blue light/red light. The limitations are the potentially discarded very low-emitting sources, the impossible dissociation of permanent and temporary sources from a single image (e.g. car headlights) and the detection thresholds that may vary depending on the JILIN image (sensor, acquisition conditions, etc.)