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JLDAILYVISION CONSTELLATION, ON-ORBIT LOW COST MICROSAT USING SUPERLEGGERA
CAMERA AT 15 MINS REVISIT**Abstract**

This paper will present the cost-effective smallsat mission, Jilin-1 GF03 satellite, with its advanced payload. The constellation is operational with 19 on-orbit satellites launched recently in 2021 and 2022. This paper will also address the significant promise for such low-cost access to space with operational Earth observation missions attainable to non-governmental organizations as well as traditional users and evolving opportunities.

Jilin-1 GF03 is a high resolution imaging small-satellites constellation developed by Chang Guang Satellite Technology Ltd. of China and commercialized by HEAD. These satellites adopt the design concept of "no platform", which is a superleggera micro satellite weighting 40 kg and designed for commercial applications. It contains the advanced lightweight structure design technology, a highly integrated electronics system, high resolution, superleggera and low-cost camera, which makes it have the characteristics of low-cost, low power consumption, low weight and high spatio-temporal resolution. After a successful in-orbit technology demonstration and validation, three groups of operational satellites have been developed and entered the stage of mass production and deployment as a constellation. The image resolution, the geometric positioning accuracy and the radiation accuracy have been improved along the mission. The Jilin-1 GF03 sub-satellite image is 0.75m GSD and the geometric accuracy meets the mapping requirements of 1:10000 scale. By the end of 2025, the full constellation of 138 satellites will be in orbit, resulting in round-the-clock, all-weather, full-spectrum data acquisition, capable of imaging anywhere on earth every 10 minutes from 10 to 16 clock. They deliver images of 18.5 km swath, with panchromatic resolution of 0.75m, and multispectral resolution of 3m. The business model consider that anyone can buy a JL-1 GF03 and incorporate the constellation. This paper introduces the radiation consistency technology improvement for satellite constellation image products. It explains the on-orbit calibration method and the test results. Considering the high spatio-temporal resolution of the Jilin-1 GF03 constellation, a radiation consistency comparison with Sentinel-2 satellite was carried out. Long-term data were used to refine crop plot extraction and crop phenology analysis. The results show that Jilin-1 GF03 satellites have high radiation accuracy and strong data acquisition ability. It can construct dense long-time data sets series for fine ground feature classification and analysis, and can provide strong data support for remote sensing applications in agriculture, forestry and other fields.