



Chinese Satellites

- ZY1-02C
- ZY1-02D
- ZY3
- 2m/8m Optical Satellites
- GF-1
- GF-2
- GF-3
- GF-4
- GF-5
- GF-6
- GF-7
- GFDM
- TH-01
- BJ-2
- SV-1
- Zhuhai-1

ZY3 Satellites



ZY3-01 is the first civilian high-resolution optical stereo mapping satellite of China. It was successfully launched on January 9, 2012. It integrates mapping and resource investigation functions into one. The main leading user is the Ministry of Natural Resources of P.R. China. Other users include Ministry of Emergency Management, Ministry of Ecology and Environment, Ministry of Housing and Urban-Rural Development, Ministry of Transport, Ministry of Water Resources, and Ministry of Agriculture and Rural Affairs, etc. The satellite adopts three-linear array mapping method. The stereo images are derived from the observation with different angles of view at the same ground point through the forward, nadir and backward-looking cameras with certain intersection angles. At the same time, the three-dimensional ground coordinates are obtained accurately with precise internal and external orientation parameters, which can be used to produce 1:50,000 mapping products and to carry out the updating of 1:25,000 and larger scale topographic maps. The multi-spectral data together with the high-resolution nadir panchromatic data can be used for interpretation of terrain elements, natural resources investigation and monitoring and other related applications.

The overall mapping accuracy of ZY3-01 satellite is better than that of SPOT5 in France and ALOS in Japan with similar configurations. Under the condition of a few control points, the image planar accuracy is better than 3m, the elevation accuracy is better than 2m, and the satellite's overall design for 1:50000 stereo mapping is fulfilled or even exceeded. It can also be used for 1:250000 mapping and some geographic elements updating at 1:10000 scale. In the absence of control points, the image planar accuracy is better than 10m, and the elevation accuracy is better than 5m. The direct positioning accuracy of satellite images is improved from more than 1000m to less than 10m. The accuracy of multi-spectral satellite image registration is 0.15 pixel, and the overall image quality is better than most foreign satellites with similar configurations.

ZY3-02 is a follow-up business satellite of ZY3-01, which was successfully launched on May 30, 2016. ZY3-02 satellite is optimized on the basis of ZY3-01. It carries payloads of three-linear array mapping camera and multi-spectral camera. The image resolution of forward and backward view is improved from 3.5 meters to better than 2.5 meters. It also carries a set of experimental laser altimetry payload. The satellite has better image fusion ability, higher image elevation measurement accuracy than 01 satellite. After ZY3-02 is put into operation, it networks with ZY3-01, which can shorten the re-visit period from 5 days to 3 days at the same place, and greatly improve the acquisition ability of 1:50,000 stereo mapping for graphic information resources in China.

ZY3-03 is the third one of the ZY-3 satellite series, which was successfully launched on July 25, 2020 in Taiyuan satellite launch center, China. It has the capability of stereo imaging with three-linear array camera and multi-spectral camera with the same configuration of ZY-02, and elevation measurement with laser altimeter. The elevation measurement accuracy of single laser point is better than 1m with point spacing of 3.6km. The satellite designed lifetime is 8 years longer than 5 years of 02 satellite. ZY3-03 can network with ZY3-01/02 to establish China's optical stereo mapping satellite constellation, which will shorten the re-visit period from 3 days to 1 days at the same place, and ensure the long-term, stable high resolution stereo images acquisition for national surveying and mapping. It has developed the globally advanced capability of stereo mapping and greatly improve the ability of natural resources survey for social and economic development in China.

Orbit parameters

Item	Parameter		
Satellite	ZY3-01	ZY3-02	ZY3-03
Launch vehicle	Long March Rocket Launch Vehicle	Long March Rocket Launch Vehicle	Long March Rocket Launch Vehicle
Launch site	Taiyuan satellite launch center, China	Taiyuan satellite launch center, China	Taiyuan satellite launch center, China
Satellite weight	2630 kg	≤2700 kg	≤2500 kg
Designed lifetime	5 years	5 years	8 years
Data downlink transmission mode	Image real-time transmission mode; Image recording mode; Recording and transmission simultaneously; image playback mode	Image real-time transmission mode; Image recording mode; Recording and transmission simultaneously; image playback mode	Image real-time transmission mode; Image recording mode; Recording and transmission simultaneously; image playback mode
Orbit altitude	About 506 km	About 505 km	About 505 km
Orbit inclination /local overpass time	97.421°/10:30 am	97.421°/10:30 am	97.421°/10:30 am
Orbit type/Orbital period	Sun-synchronous orbit/98 min	Sun-synchronous orbit/98 min	Sun-synchronous orbit/98 min

Sensor technical parameters

Item	Parameter					
Satellite	ZY3-01		ZY3-02		ZY3-03	
Sensor	Nadir panchromatic and Multispectral Forward panchromatic, Backward panchromatic.		Nadir panchromatic and Multispectral Forward panchromatic, Backward panchromatic.		Nadir panchromatic and Multispectral Forward panchromatic, Backward panchromatic.	
GSD	Nadir panchromatic: 2.1 m 22° Forward and Backward panchromatic: 3.5 m Nadir multispectral: 5.8 m		Nadir panchromatic: 2.1 m 22° Forward and Backward panchromatic: 2.5 m Nadir multispectral: 5.8 m		Nadir panchromatic: 2.1 m 22° Forward and Backward panchromatic: 2.5 m Nadir multispectral: 5.8 m	
Spectral band	Panchromatic image	0.50 ~ 0.80 μm	Panchromatic image	0.50 ~ 0.80 μm	Panchromatic image	0.50 ~ 0.80 μm
	Multispectral image	0.45 ~ 0.52 μm	Multispectral image	0.45 ~ 0.52 μm	Multispectral image	0.45 ~ 0.52 μm
		0.52 ~ 0.59 μm		0.52 ~ 0.59 μm		0.52 ~ 0.59 μm
		0.63 ~ 0.69 μm		0.63 ~ 0.69 μm		0.63 ~ 0.69 μm
	0.77 ~ 0.89 μm		0.77 ~ 0.89 μm		0.77 ~ 0.89 μm	
Swath width	Nadir panchromatic: 50 km, single scene images 2500 km ² Nadir multispectral: 52 km, single scene images 2704 km ²		Nadir panchromatic: 50 km, single scene images 2500 km ² Nadir multispectral: 52 km, single scene images 2704 km ²		Nadir panchromatic: 50 km, single scene images 2500 km ² Nadir multispectral: 52 km, single scene images 2704 km ²	
Site revisit period	5 days		5 days		5 days	
Daily imaging capability	Panchromatic image: about 1,000,000 km ² /day Fusion image: about 1,000,000 km ² /day		Panchromatic image: about 1,000,000 km ² /day Fusion image: about 1,000,000 km ² /day		Panchromatic image: about 1,000,000 km ² /day Fusion image: about 1,000,000 km ² /day	
Laser altimeter	NULL		test load		Wavelength	1064nm
					Footprint size	70m@500 km
					Operation distance	500±20 km

Item		Parameter		
			Repeat frequency	≥ 2Hz
			Distance measurement accuracy	≤ 1m

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Natural Resources Satellite
Remote Sensing Cloud Service Platform