Nano star tracker AZDK-1 is the optimal solution for nano and microsatellites in terms of mass-dimensional characteristics, power consumption and cost. The cost of the Nano star tracker AZDK-1 is $40 000.

Fig. 2. Nano star tracker AZDK-1 in the transport suitcase

CONTACTS:

Azmerit LLC

www.azmerit.ru

Leninskie Gory, vladenie 1, stroenie 75G, Moscow, 119234

Mob.: +7-915-176-31-55, +7-985-303-64-07

Email: marat.abubekerov@gmail.com

Nano Star Tracker AZDK-1

Azmerit LLC

Sternberg Astronomical Institute Lomonosov Moscow State University

The Nano star tracker AZDK-1 is designed to determine the spatial orientation of the structures on which it is installed with respect to the inertial equatorial star coordinate system by observing stars in the visible spectral range.

The Nano star tracker AZDK-1 successfully passed the full cycle of ground tests including functional, vibrodynamic, thermal vacuum tests and test in the night sky.

To measure the permeable magnitude of the star tracker at the time of its work (exposure 0.1 sec), observations of the starry sky were performed. The value of penetrating ability - 5.8 magnitude allows Nano star tracker AZDK-1 to work confidently across the entire starry sky. For the Nano star tracker AZDK-1, an original onboard catalog of ~ 2,400 stars has been created.

The Nano star tracker AZDK-1 has passed vibrodynamic tests. During the tests, the star tracker was subjected to sinusoidal, random (white noise) and shock effects on three axes X, Y, Z. Peak shock acceleration was 25 g with an exposure duration of 1-3 ms.

In the process of thermal vacuum testing, the pressure inside the chamber did not exceed $2 \cdot 10^{-6}$ bar. The extreme temperatures of the thermal cycle were -27 ºC and +57 ºC. The total time of the technological vacuum was 71 hours and 40 minutes. During the thermal vacuum tests, the operation of the star tracker, the change in focal length, dark currents and the functioning of the calibration shutter and the Peltier element were continuously checked.

The results of thermal vacuum tests showed that the Nano star tracker AZDK-1 provides its characteristics, and also maintains the performance, structural integrity and appearance after exposure to thermal cycles in the claimed temperature range from minus 27 ºC to +50 ºC under high vacuum.

Currently, there is an active preparation for flight tests aboard the technological nanosatellite TNS-0-3 produced by JSC "RCS". Flight tests are scheduled for the first half of 2020.

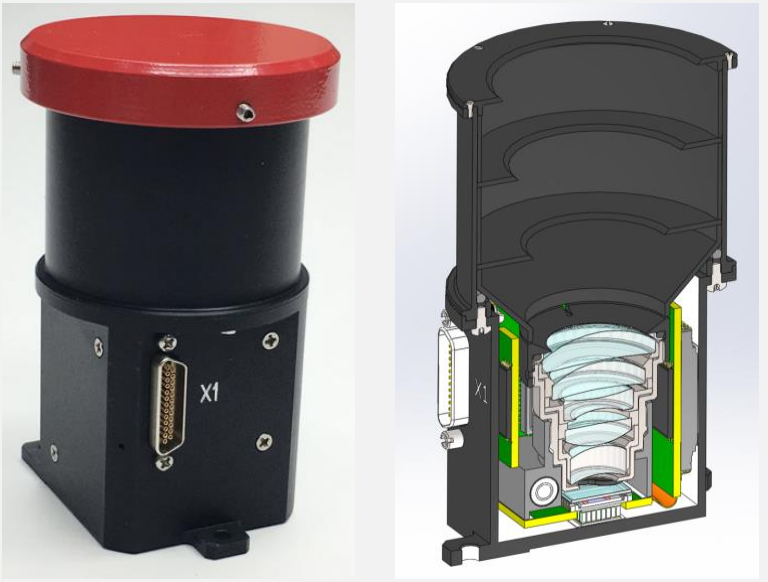

Fig. 1. Nano Star Tracker AZDK-1: Appearance and Cut

Parameters	Value
Entrance pupil	18,6 mm
Field of view	22°
CMOS geometry, Pixel size	1024×1280 pxls 5,3 μm×5,3 μm
Dimensions, mass (with baffle)	56×60×93 mm, 193 g
Power (w/o Peltier cooler)	0,3 W
Volume of Stellar Catalogue	2400 star up to $5,5^{m}$
Accuracy $\sigma_{x,y}/\sigma_z$	5″/30″ (ω < 3°/sec)
Update rate	5 Hz
Interface	RS-485, CAN
Supply Voltage	5V