

A satellite image of a river delta system. The main river channel is highlighted in a vibrant cyan color, branching out into smaller channels and a large, irregularly shaped water body on the right side. The surrounding land is shown in shades of brown, tan, and grey, with some green patches indicating vegetation. The overall texture is grainy, typical of satellite imagery.

**CATALOGUE of
Products and
Services**

 **KGS**
SPACE TECHNOLOGIES



KazEOSat-1
Kazakhstan, Ushkonyr plateau
Resolution: 1 m

CONTENT

1.	About Company	6
2.	Earth Remote Sensing Space System of the Republic of Kazakhstan	8
3.	KazEOSat-1	10
3.1	Shooting mode of KazEOSat-1	12
4.	KazEOSat-2	14
4.1	Shooting mode of KazEOSat-2	16
5.	List of geoproducts and types of data processing	18
6.	Products and services of Earth Remote Sensing Space System of the Republic of Kazakhstan	20
7.	Geoservices	28
8.	High-accuracy satellite navigation system services of the Republic of Kazakhstan	30
9.	Services of the high-precision satellite navigation system of the Republic of Kazakhstan	32
10.	Assembly Integration and Testing center	36
11.	Partners and Distributors	38
12.	Contacts	40
13.	Notes	42

KazEOSat-1
Kazakhstan, Nur-Sultan city
Resolution: 1 m

KazEOSat-1
Azerbaijan, Baku city
Resolution: 1 m

Earth Remote Sensing Space System of the Republic of Kazakhstan

As the national operator of the Earth remote sensing space system of the Republic of Kazakhstan, Company has been providing space images from Earth remote sensing satellite of high resolution KazEOSat-1 since June 26, 2015, and from the satellite of medium resolution KazEOSat-2 since July 24, 2015.

A space image is a paper or a digital copy of Earth surface obtained by remote sensing from a spacecraft.

Space acquisition is most effective in surveying of large areas and at the same time is a safer, more cost-effective solution in comparison with traditional ground methods.

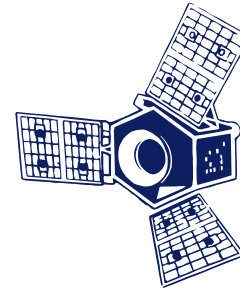
Space images allow us to solve problems in various sectors of the economy.

Two spacecraft of the Earth remote sensing space system of the Republic of Kazakhstan (KazEOSat-1, KazEOSat-2) are operated in regular mode in outer space and a ground segment that meets world standards for conducting ultra-modern space monitoring was created.

KazEOSat-1
Kazakhstan, Karaganda city
Resolution: 1 m

KazEOSat-1

High resolution spacecraft



EXPECTED LIFE TIME	At least 7 years	
ORBIT ALTITUDE	750 km (Sun-Synchronous)	
AVERAGE REVISIT TIME	3 days, with no limits on angle	
SENSOR NAME	"NAOMI" (New AstroSat Optical Modular Instrument)	
SENSOR TYPE	optical	
IMAGING MODE	Panchromatic	Multispectral
BANDS AND SPECTRAL RANGES	PAN- 0.45-0.75 μm ;	Blue -0.45-0.52 μm ; Green -0.53-0.60 μm ; Red -0.62-0.69 μm ; NIR - 0.76-0.89 μm ;
SPATIAL RESOLUTION	1 m	4 m
DEPTH OF IMAGING (BITS OF RADIOMETRIC RESOLUTION)	12 bits	
SWATH WIDTH	20 km	
ALONG-TRACK IMAGING CAPACITY	2000 km	
VIEWING/INCIDENCE ANGLES	Up to 35° off-Nadir	
GEOMETRIC ACCURACY	15 m (1D, RMS) CE90 without GCP	
STEREO-PAIR CAPACITY	Capable of single-pass stereo-pair acquisitions	
SYSTEM CAPACITY	Up to 220 000 km ² per day	
CAPTURED TERRITORY	309 million square kilometers of captured territory in 5 years	



KazEOSat-1
Afghanistan, Ishkashim city
Resolution: 1 m

SHOOTING MODES

Strip mode obtained when shooting along the satellite route, with a width of 20 km and a length of 20 km to 2000 km

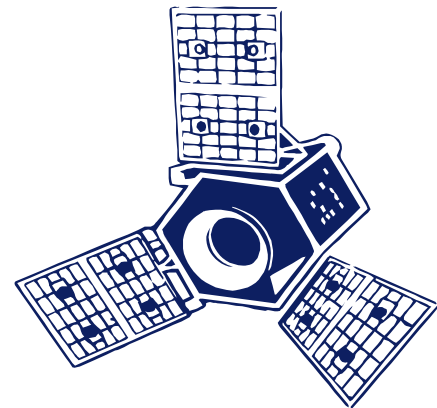
Area mode conducted along the movement of the spacecraft with the possibility of conducting three adjacent bands (each 20 km) of the shooting with a width of 60 km and a length of 20 km to 90 km

Stereo mode conducted along the movement of the spacecraft with the possibility of shooting the same territory (object) from different shooting angles with a width of 20 km and a length of 20 km to 90 km

KazEOSat-1 is capable of shooting the whole world with an area of up to 220,000 km² per day.

The amount of data is stored in a 1 Tbit storage using SDRAM memory devices.

Data is transmitted to the Earth via the X-band communication channel with a speed of 270 ± 20 Mbit/s



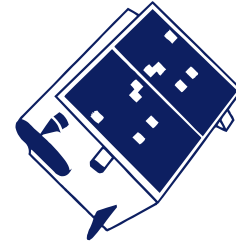
The pixel size on the ground (GSD) KazEOSat-1 is 1 m for the panchromatic channel and 4 m for multispectral channels.

As a result of the synthesis of a 1 meter panchromatic channel with 4 meter multispectral channels, a 1 meter color product is obtained (pan-sharpening).

KazEOSat-1
Kazakhstan, Zhezkazgan city,
reservoir
Resolution: 1 m

KazEOSat-2

Medium resolution
spacecraft



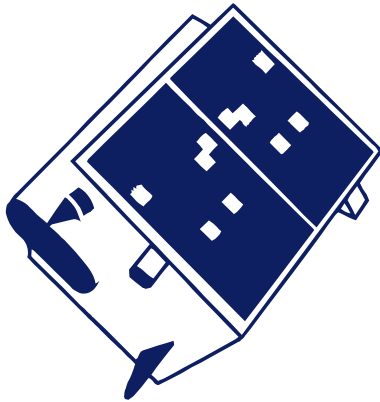
EXPECTED LIFE TIME	At least 7 years
ORBIT ALTITUDE	630 km (Sun-Synchronous)
AVERAGE REVISIT TIME	3 days, with no limits on angle
SENSOR NAME	KEIS (Kazakh Earth Imaging System), also known as “JSS-56” (Jena-Optronik Spaceborne Scanner-56) or “MSI” (Multispectral Imager)
SENSOR TYPE	optical
IMAGING MODE	Multispectral
BANDS AND SPECTRAL RANGES	Blue -0.45-0.52 μm ; Green -0.53-0.60 μm ; Red -0.62-0.69 μm ; Red-edge-0.69 – 0.73 μm ; NIR - 0.76-0.89 μm ;
SPATIAL RESOLUTION	6,5 m
DEPTH OF IMAGING (BITS OF RADIOMETRIC RESOLUTION)	12 bits
SWATH WIDTH	77 km
ALONG-TRACK IMAGING CAPACITY	4000 km (with 12-bit image formation)
VIEWING/INCIDENCE ANGLES	Up to 35° off-Nadir
GEOMETRIC ACCURACY	30 m (1D, RMS) CE90 without GCP
SYSTEM CAPACITY	Up to 1 000 000 km ² per day
CAPTURED TERRITORY	565 million square kilometers of captured territory over 5 years

KazEOSat-1
India, Delhi city
Resolution: 1 m

SHOOTING MODES

Strip mode obtained when shooting along the satellite route, with a width of 77 km and a length of 77 km to 2000 km

Area mode consists of two adjacent overlapping bands 77 km wide and 90 km long



KazEOSat-2 is capable of shooting the whole world with an area of 1,000,000 km² per day.

The amount of data is placed in a storage capacity of 16 GB using SDRAM memory devices, which allows to display a shooting band equal to 1925 km in one pass.

Data is transmitted to the Earth via the X-band communication channel at a speed of 160 Mbit/s.

The KazEOSat-2 system includes multispectral cameras that receive data simultaneously.

The multispectral capability includes 5 channels in the visible and near infrared spectral ranges (red, green, blue, extreme red and near infrared).

KazEOSat-1
Kazakhstan, Aktobe city,
Resolution: 1 m

LIST OF GEOPRODUCTS AND PROCESSING TYPES

INITIAL GEOPRODUCTS:	
Title	Description of processing types
L1	<p>The images of L1 processing level represents the digital space images with radiometric correction.</p> <p>The images are not leaded to any projection.</p> <p>The images of L1 processing level are used to create the L3 –L5 products.</p>
L2	<p>The images of L2 processing level represents the digital space images including the radiometric, geometric (sensor) correction.</p> <p>The images issued for mapping projection.</p>
L2+RPC	<p>Images of L2 + RPC processing level are represented as digital space images after applying radiometric correction. Reduced to cartographic map projection a file with rational polynomial coefficients (RPC) is included in the package.</p>
Value-added Geoproducts:	
L3	<p>The images of processing level L3 represents the digital space images including the radiometric, geometric correction.</p> <p>The images issued for mapping projection.</p> <p>The images orthorectified (the image has relief modifications) using the digital elevation model (DEM).</p> <p>The product is presented as:</p> <ul style="list-style-type: none"> scenes or scanned swath; scene of the territory according to the shape-file sent by Customer; Pan sharpening (optionally, enhanced multispectral image); <p>The use of ground control points (optionally, if any).</p>
L4	<p>Digital surface model (DSM) and digital elevation model (DEM).</p> <p>The product is issued for mapping projection.</p> <p>The product is presented as scene of the territory according to the shape-file sent by Customer.</p>
L5	<p>The images of processing level L5 represent the mosaic created from the geoproducts L3 or L4.</p> <p>The product is provided as follows: mosaic Pan sharpening (optional, enhanced multispectral image)</p>

KazEOSat-1
USA, New-York city
Resolution: 1 m

PRODUCTS AND SERVICES OF EARTH REMOTE SENSING SPACE SYSTEM OF THE REPUBLIC OF KAZAKHSTAN

SPACE MONITORING OF THE AGRO-INDUSTRIAL COMPLEX

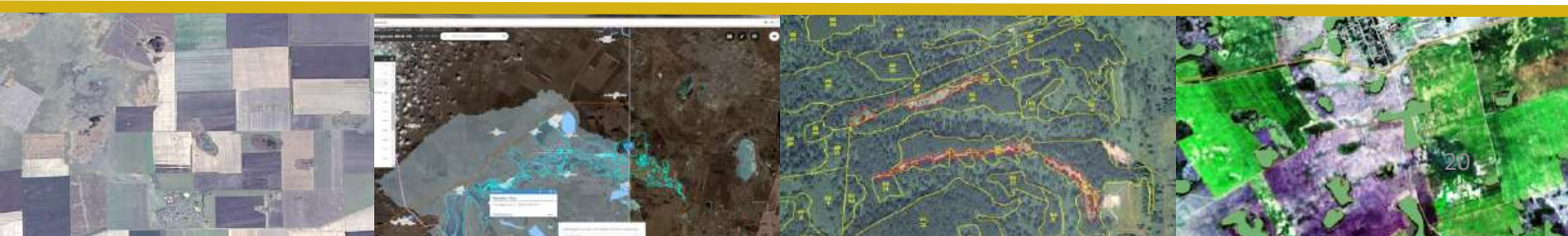
- Accounting and use of agricultural land
- Crop production
- Monitoring rangelands
- Irrigation and land reclamation
- Hunting farm

SPACE MONITORING OF WATER RESOURCES

- Monitoring of river systems
- Monitoring of lakes and large reservoirs
- Monitoring of water management complex facilities
- Monitoring of the state of hydraulic structures
- Monitoring of irrigated areas of the Republic of Kazakhstan
- Monitoring of transboundary rivers

SPACE MONITORING OF FOREST RESOURCES

- The earlier detection of fires of total forest and steppe areas
- Assessment of damage and potential danger to human settlements
- Mapping of areas affected by fires
- Determination of burnt areas and assessment of burned forest sites
- Determination of burnt areas and assessment of burned forest sites
- Assessment of forest exploitation by logging
- The detection, control and monitoring of illegal logging
- Forest sites zoning and typification of forest communities



KazEOSat-1
Kazakhstan, Almaty city,
Resolution: 1 m

SPACE MONITORING OF WILDLIFE RESOURCES

- Determination of moisture content in soil and vegetation composition in the areas of lambing and migration of saigaks
- Determination of fodder base in habitats of wild ungulates recorded in the Red Book

SPACE MONITORING OF PERENNIAL PLANTATIONS

- Determination of actual areas of perennial plantations
- Accounting and monitoring of perennial plantations
- Mapping and assessment of condition of green plantations

SPACE MONITORING OF FISHERIES RESOURCES

- Determination of oil pollution sites and boundaries in the water sector of the Kazakhstan sector of the Caspian Sea
- Determination of physical parameters, boundaries of fishery water bodies and (or) areas with indication of users of wildlife on designated fishery areas

SPACE MONITORING OF SPECIALLY PROTECTED NATURAL AREAS

- Monitoring of the status of existing specially protected natural areas (SPNA), revealing the facts of violation of the SPNA protection regime – logging, construction cases, changes in landscapes, formation of landfills
- Cartography of landscapes and lands within SPNA
- Monitoring the dynamics of valuable landscapes of SPNA (degradation, disappearance)
- Forming and clarifying the boundaries of existing and established SPNA
- Complex analysis of landscapes for the organization of new SPNA or expansion of the boundaries of existing SPNA



KazEOSat-1
Egypt, Giza city
Resolution: 1 m

SPACE MONITORING OF EMERGENCY SITUATIONS

- Monitoring of forest and steppe fires
- Mapping of fires
- Mapping of areas affected by fire
- Monitoring of floods and flood waters
- Emergency monitoring of emergency zones

SPACE MONITORING OF AREAS OF GROWTH OF NARCO-CONTAINING PLANTS

- The identification of the locations of the zones of growth of narco-containing plants
- Determination of the boundaries of the range and areas of growth of narco-containing plants of hemp

SPACE MONITORING OF SOLID HOUSEHOLD WASTE

- Monitoring of the location of waste production and consumption for the detection of a move beyond the licensed boundaries of waste
- Identification of unauthorized dumps
- Monitoring of dynamics of boundaries of polygons of waste production

SPACE MONITORING IN THE OIL AND GAS SECTOR

- Monitoring of oil ambers for pollution and leakage of oil production waste
- Monitoring of oil and oil pipelines, illegal tapping and extraction
- Identification of oil spills on main oil pipelines





KazEOSat-1
Kazakhstan, Balkhash lake,
Resolution: 1 m

SPACE MONITORING OF SUBSOIL USERS

- The detection of violations of the boundaries of licensed areas by subsoil users
- Identification of the facts of unauthorized mining
- Development of soil cover degradation with open method of mining of solid minerals

LAND SERVICES

- Territorial land management
- Land registry

TOWN-PLANNING ACTIVITIES SERVICES

- Implementation of works on territorial planning
- Implementation of works on town-planning zoning
- Planning of territories
- Town-planning cadastre

CARTOGRAPHIC SERVICES

- Creation of state topographic maps
- Updating of state topographic maps
- Creation of topographic plans
- Updating of topographic plans
- Creation and actualization of navigation maps



KazEOSat-1
UAE, Dubai city
Resolution: 1 m

GEOSERVICE

DEVELOPMENT AND TECHNICAL SUPPORT OF THE PORTAL GEOINFORMATION ANALYTICAL SERVICE (GEOPORTAL)

- Rapid receipt of updated snapshots
- Viewing and analysis of cartographic data
- Conducting space monitoring for making operational decisions
- Reduction the number of trips for visual detection
- Training of geoportal users



KazEOSat-1
Kazakhstan, Taldykorgan city,
Resolution: 1 m

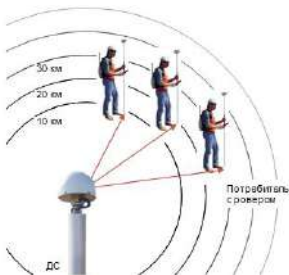
HIGH-ACCURACY SATELLITE NAVIGATION SYSTEM SERVICES OF THE REPUBLIC OF KAZAKHSTAN

HIGH-PRECISION POSITIONING SERVICES

- Providing RTK corrections in real time from a network of 60 differential stations of the HASNSS RK
- Providing measurement information (RINEX files) in post-processing from differential stations of the HASNSS RK
- Post-processing satellite measurements with adjustment / without adjustment
- Recalculation of coordinates from one coordinate system to another

NAVIGATION VERIFICATION SERVICES

- Verification of GNSS receivers of geodetic accuracy class
- Verification of the aerological sounding system GRAW
- Verification of a complex of measuring values of the current time with ParkNet photofixation
- Verification of the frequency comparator VCH-314



KazEOSat-1
Myanmar, Yangon city
Resolution: 1 m

MONITORING AND DISPATCHING SERVICES OF MOBILE OBJECTS

- Monitoring of movement and control of passenger transport
- Monitoring of movement and control of freight transport
- Monitoring the movement of transit goods
- Monitoring the movement of agricultural equipment
- Personal monitoring

SYSTEM CREATION SERVICES MONITORING SPACE-EXTENDED OBJECTS

- Monitoring of deformations and displacements of bridges and road racks
- Monitoring of deformations and displacements during the construction and operation of high-rise buildings and structures
- Monitoring of deformations and displacements of hydraulic structures
- Monitoring of open pit deformations and oil platform displacements

IMPLEMENTATION OF PRODUCTION AND SURVEY WORKS

- Creating topographic plans and performing executive surveys
- Design and survey work
- Stake out design points
- Construction of a geodetic base, including state base
- Stakeout of linear structures (power transmission lines, pipelines)
- Planning and high-altitude geolocation of satellite images
- Geodetic support for road construction works



KazEOSat-1
Kazakhstan, Kyzylorda city,
Resolution: 1 m

ASSEMBLY INTEGRATION AND TESTING (AIT) Center

The purpose of the project is to create the technological and infrastructure basis for a spacecraft assembling, integration and test in the Republic of Kazakhstan. On sites, projected facilities intended to be utilized for different types of payloads integration with satellite's buses and further testing.

The composition of the production units includes:

- Special Design and Technology Bureau, ensures the implementation of all design and engineering work;
- SBIK – AIT center is equipped with facilities that provides assembling, integration and testing as a closed loop for a spacecraft manufacturing weighing from 100 kg and up to 6 tons;
- SKTB workshops, which have laboratories, clean rooms and production areas for the spacecraft's individual components development..

Production capacities of SBIK:

performing assembling, integration and tests of satellites weighing up to 6 tones with maximum dimensions 3 x 3 x 6 m;

types of tested spacecraft: telecommunication spacecraft, Earth remote sensing, scientific and technological.


The operator of the equipment and sections of the AIT center is LLP "Ghalam". This is a joint venture of JSC "NC "Kazakhstan Gharysh Sapary" and the French private company "Airbus Defense and Space".



KazEOSat-1
Monaco
Resolution: 1 m

OUR PARTNERS AND DISTRIBUTORS









KazEOSat-1
Kazakhstan, Tselinograd district,
"Sharp stone" dam on the Yesil River
Resolution: 1 m

CONTACTS

Nurlybek Nabiyeu
Head of Sales Office

 nnabiyev@gharysh.kz
 +7 (7172) 24 87 99, +7 702 799 39 49



Ainel Oryspayeva
Regional Sales Manager

 a.oryspayeva@gharysh.kz
 +7 (7172) 24 88 38, +7 (778) 777 33 39

Alexandra Trepashko
Regional Sales Manager

 a.trepashko@gharysh.kz
 +7 (7172) 24 88 59, +7 701 900 68 69

Aibol Nsanov
Regional Sales Manager

 a.nsanov@gharysh.kz
 +7 (7172) 24 88 38, +7 (701) 229 43 17

Individual approach to each customer

gharysh.kz

gharysh.com

svsn.kz



KazEOSat-1
North Korea, Pyongyang city
Resolution: 1 m

KazEOSat-1
Kazakhstan, Oral city,
Resolution: 1 m



JSC «National Company «Kazakhstan Gharysh Sapary»
Republic of Kazakhstan, Nur-Sultan city, Yessil district,
Turan avenue, 89 , National Space Center

© 2019 by JSC «National Company
«Kazakhstan Gharysh Sapary»
Privacy policy