LAND RESOURCES OF KAZAKHSTAN

Area – 2,72 mln km²
Population – 16 Mln

<table>
<thead>
<tr>
<th>Land use</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mln. ha</td>
</tr>
<tr>
<td>Territory of Republic</td>
<td>272,4</td>
</tr>
<tr>
<td>Agriculture lands</td>
<td>222,6</td>
</tr>
<tr>
<td>Arable lands</td>
<td>23,6</td>
</tr>
<tr>
<td>Deposits</td>
<td>5,2</td>
</tr>
<tr>
<td>Pastures and haymakings</td>
<td>193,8</td>
</tr>
</tbody>
</table>

Vegetation map of Kazakhstan

Vegetation map of Kazakhstan

National Center of Space Researches and Technologies
1950
“Baykonur” complex

National Center of Space Researches and Technologies
National space agency of the Republic of Kazakhstan was created by President Decree #302 of the 27 March 2007. Chairman of National Space Agency is Kazakhstan Astronaut – Talgat Musabayev.

1994
T. Musabayev first flight to space station “Mir”

1998
T. Musabayev second flight to SS ”Mir”

2001
T. Musabayev flight to ISS
Mission: Astronomical researches of galaxies, stars and planets

Tien-Shan scientific observatory
(2800 m above the sea level)

Observation Complex «Assi-Turgen»
(2750 m above the sea level)

Astrophysical complex
(1450 m above the sea level)

V. G. Fesenkov Astrophysical Institute (1950)

National Center of Space Researches and Technologies
Ionosphere Institute (1983)

Mission - research of Sun-Earth connections and near space, “space weather” forecast
Institute of space technique and technologies (2010)
Mission: development of satellite onboard equipment and control systems

International Cooperation

Kazakhstan
France «Demeter»
Russia «Ionozond»
Ukraine «Ionosat»
Canada «EPAC»

National Center of Space Researches and Technologies
ThalesAlenia Space
IZMIRAN
National Center of Space Researches of France
GEOSCAN
Kazakhstan Ganysh Sapary

Institute of Theoretical Mechanics
Institute of Space Researches
Center of Science Research of Earth and Space
Institute of Earth Physics
Sultangazin Space Research Institute (1991)

Mission: Earth observation, Development of National space monitoring system of Kazakhstan

Founder and first director of SRI - Academician U.M. Sultangazin (died in 2005)
National Center of Space Researches and Technologies

NATIONAL SPACE MONITORING SYSTEM

Receiving centers in Astana and Almaty provide space images of Kazakhstan and neighboring countries with high, medium and low resolution in different spectral diapasons.

RECEIVING SENSORS:

- NOAA AVHRR (USA)
- Terra/Aqua MODIS (USA)
- IRS-1D (INDIA)
- RADARSAT-1 (CANADA)
- RESOURSESAT (IRS)
REMOTE SENSING DATA ARCHIVE

<table>
<thead>
<tr>
<th>№</th>
<th>Scanner</th>
<th>Beginning of reception (year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NOAA AVHRR</td>
<td>1997</td>
</tr>
<tr>
<td>2</td>
<td>Terra/Aqua MODIS</td>
<td>2001</td>
</tr>
<tr>
<td>3</td>
<td>IRS-1D/1C</td>
<td>2004</td>
</tr>
<tr>
<td>5</td>
<td>RADARSAT-1</td>
<td>2005</td>
</tr>
<tr>
<td>6</td>
<td>RESOURCESAT</td>
<td>2006</td>
</tr>
</tbody>
</table>

Archive accumulates multiyear space images for research of environment long-term changes.

Archive is kept in two identical copies in Almaty and Astana.
NATIONAL SPACE MONITORING SYSTEM

AGRICULTURE MONITORING
- Mapping of sown areas and estimation of crops
- Crops yield forecast
- Mapping of crops affected by diseases and pest
- Monitoring of agrotechnical field works
- Monitoring of agriculture lands productivity

EMERGENCY MONITORING
- Snow coverage monitoring
- Flood monitoring
- Fire monitoring
- Oil pollutions monitoring
- Earthquake monitoring

ENVIRONMENT MONITORING
- Caspian Sea monitoring
- Aral Sea monitoring
- Semipalatinsk nuclear test site monitoring

Sultangazin Space Research Institute
Monitoring of fires
Monitoring of floodings
Monitoring of oil pollutions
DEVELOPMENT OF NETWORK RECEIVERS STATIONS (GPS, GLONASS)

GPS items of local and permanent networks near to Almaty city

Distribution of the maximal shift pressure in a superficial layer according to GPS-supervision of Northern Tien Shan

Line of critical speed of all-round deformation and epicenters of the strongest earthquakes
MONITORING OF REGIONS WITH SEISMIC ACTIVITY
(Temperature fields analysis)

Comment: 0 day is corresponding to May 22, 2003
GEODYNAMICS MONITORING
(3-D and Interferometry analysis)
On December 2010 was successfully completed site survey for SA-VSAT WINDS station with engineers from JAXA and HIREC CO.

On February-March 2011 an engineer from NCSRT successfully completed 7th Sentinel Asia System Operation Training in Kathmandu, ICIMOD.
NCSRT prepared the new concrete foundation, Lightning Rod, new PC for Regional Server and all required materials for installation and configuration SA-VSAT WINDS station and Regional Server.
Antenna, IDU and Regional Server was installed, configured and tested successfully by JAXA contractors, specialists from HIREC Co and FUJITSU Co.
In April 2011 the heavy flooding happened in West Kazakhstan.

There was evacuated more than 3000 people.

5 objects of public health services and 14 electro substations was flooded, disconnected from the electric power more than 5200 houses, 630 subscribers of communication and 768 consumers of gas.
Soon, after sending an EOR, NCSRT successfully received using SA-VSAT WINDS station ALOS and Formosat satellite Images, which displayed before and after disaster situation of that region.
Sentinel Asia

ALOS AVNIR image before disaster
Sentinel Asia

ALOS AVNIR image after disaster
Sentinel Asia

ALOS PALSAR image after disaster
Analyzed data was uploaded on WEB-GIS portal http://emergency.gzi.kz

Also analyzed data was sent to Ministry of Emergency Situations and Emergency department of West Kazakhstan oblast
We would like to invite all of you to take a part in:

INTERNATIONAL CONFERENCE “INDEPENDENT KAZAKHSTAN: 20 YEARS OF SPACE RESEARCH”

http://conference.gzi.kz
THANK YOU FOR ATTENTION!