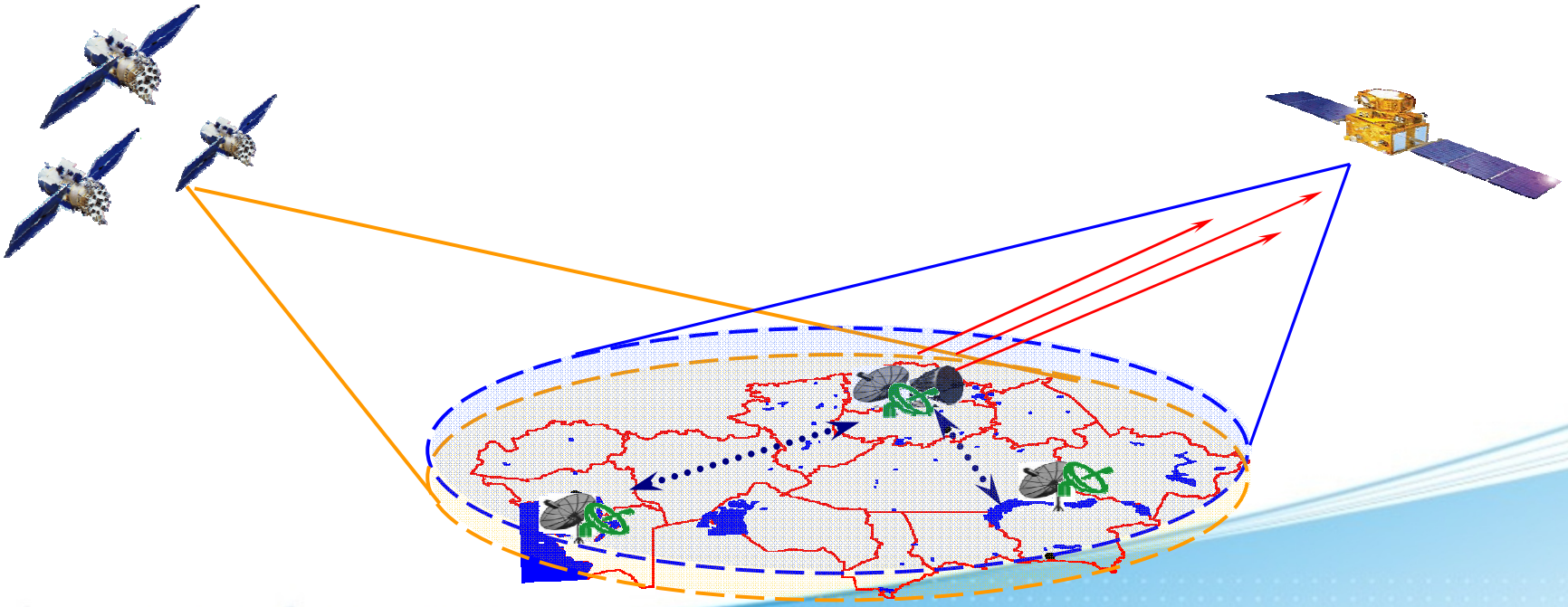
National space agency of the Republic of Kazakhstan

JSC «National Company «Kazakhstan Gharysh Sapary»

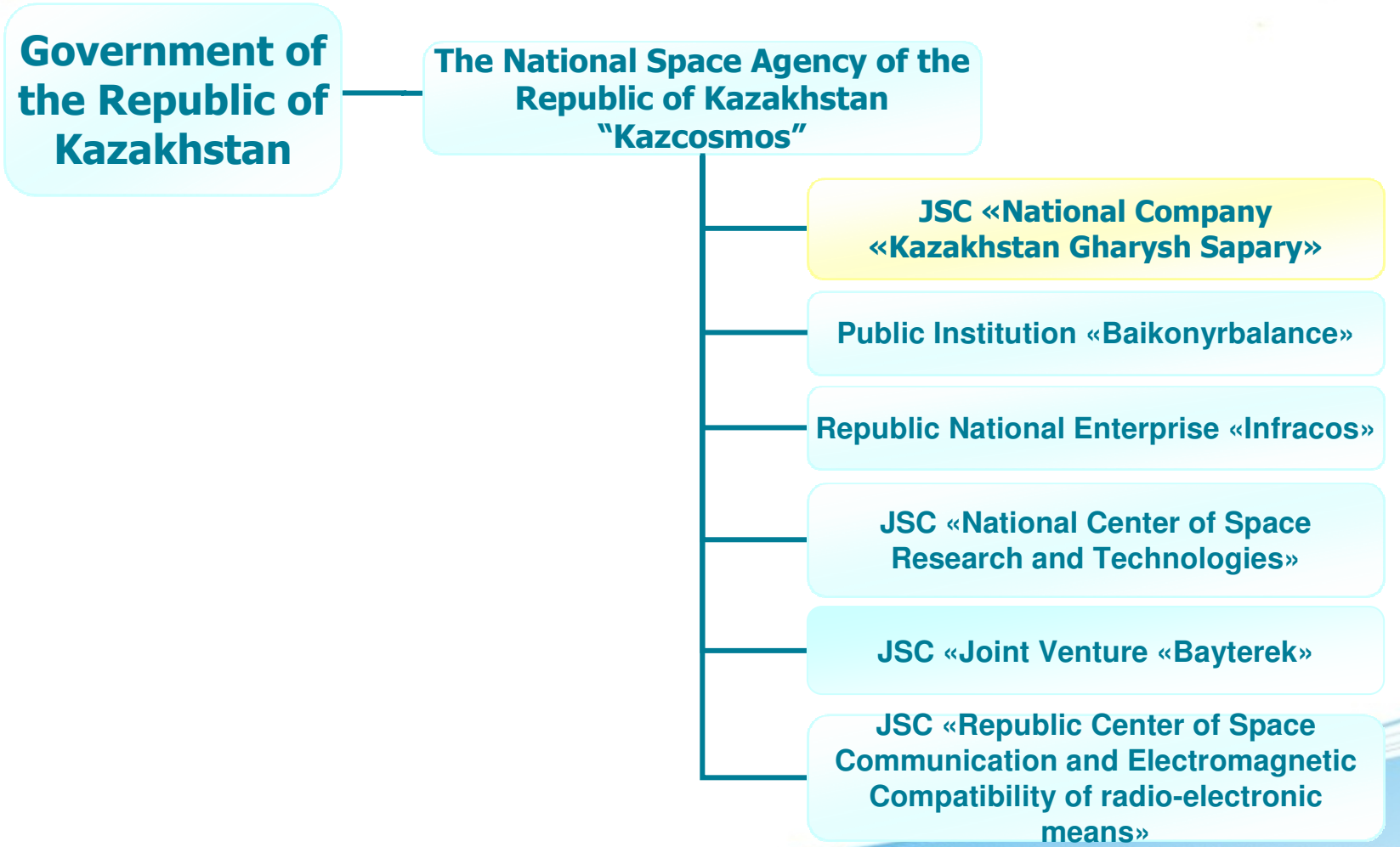
PROJECT
«CREATION OF GROUND – BASED INFRASTRUCTURE OF DIFFERENTIAL GLOBAL NAVIGATION SATELLITE SYSTEM IN THE REPUBLIC OF KAZAKHSTAN»



The Republic of Kazakhstan

- The Republic of Kazakhstan is situated in the central part of the Eurasian continent at the crossroads of the most ancient world civilizations and on crossing of transport arteries and social, economic, cultural and ideological communications between Europe and Asia;
- The area of the Republic of Kazakhstan is 2,724,900 square km, part of which is water surface that is 47,500 square km;
- about 16,305,000 people live in 14 regions of the Republic of Kazakhstan;
- the Republic of Kazakhstan possesses the large resources of oil, natural gas, coal, iron ore, manganese, chrome, nickel, cobalt, copper, molybdenum, lead, zinc, bauxites, gold, uranium and etc.

SPACE INDUSTRY



THE MAIN PRINCIPLES OF SPACE DEVELOPMENT

- building a uniform technological process that allows to carry out space projects encompassing elaboration, manufacture, testing, launch and further operation of space systems and complexes
- cooperation with world developers of space technology in order to provide complete transfer of space technologies into Kazakhstan
- directivity of space systems and complexes on rendering qualitative products to various consumers

JSC «National Company «Kazakhstan Gharysh Sapary»

- **The Joint-Stock Company «National Company «Kazakhstan Gharysh Sapary» was created under the Government regulation of the Republic of Kazakhstan on the 17th of March in 2005 and it's one of the many companies of the Republic of Kazakhstan National space agency.**

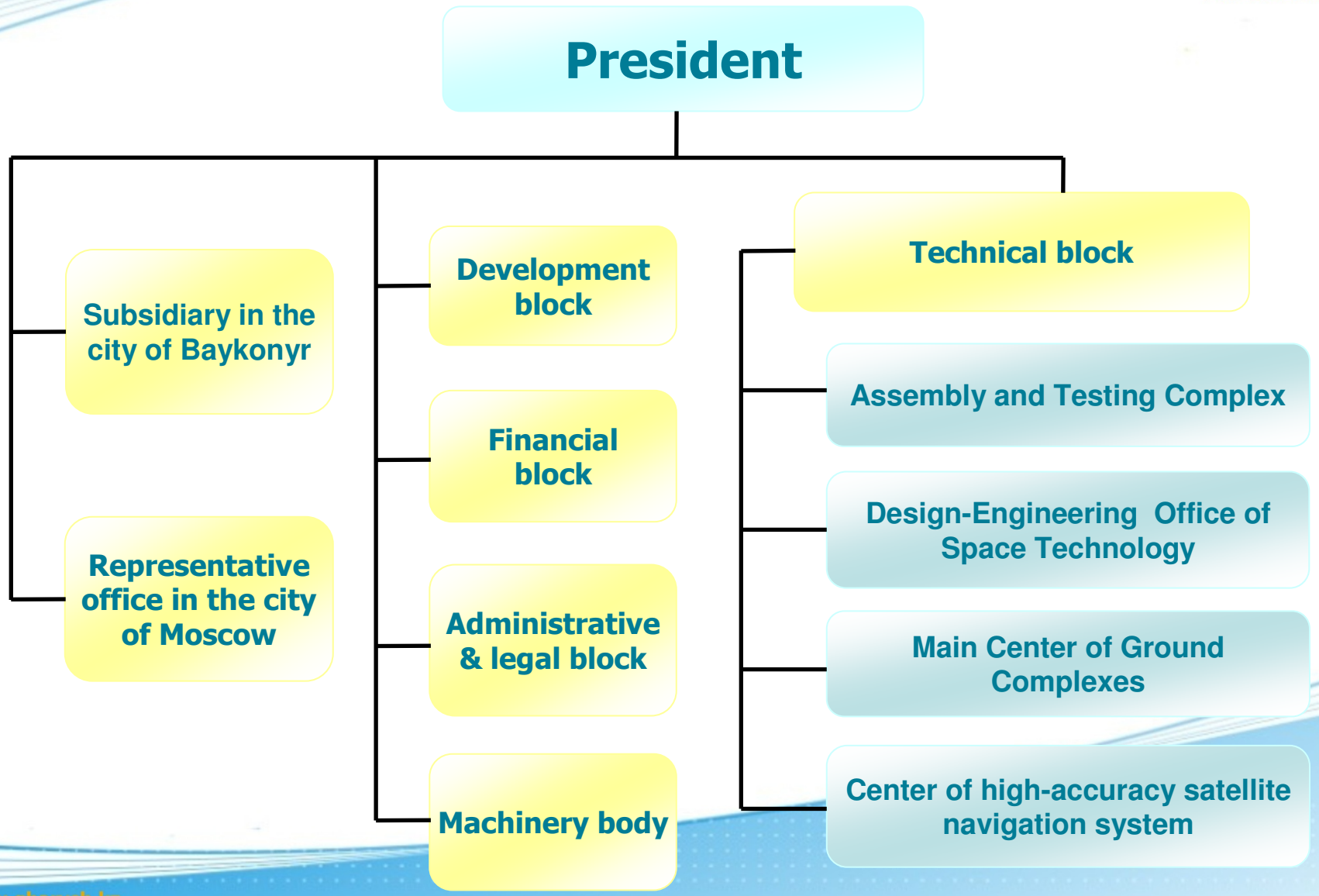
- **The basic directions of the Company's activity are:**

  - elaboration and realization of current, long-term interindustry programs in the Republic of Kazakhstan space field;
  - implementation of space technologies promoted solving social and economic problems of the Republic of Kazakhstan;
  - carrying out development activities in creation of space systems and complexes

THE COMPANY MISSION

to implement competitive space technologies
in the interests of the Republic of Kazakhstan

ORGANIZATIONAL CHART

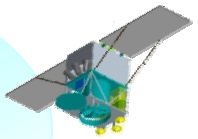


THE MAIN COMPANY'S PROJECTS

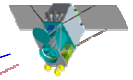
- Creation of the Earth Remote Sensing Space System of the Republic of Kazakhstan
- Creation of the Assembly and Testing Complex of the Engineering and Design Office of Space Technology
- Creation of Creation of ground-based infrastructure of Differential Global Navigation Satellite System in the Republic of Kazakhstan
- Creation of the Space Center in the city of Astana

EARTH REMOTE SENSING SPACE SYSTEM

PROJECT GOAL:
Creation of the Earth Remote Sensing Space System that includes 2 remote sensing satellites, satellites' ground control complex, ground image processing complex for data collection and processing



TIME SCHEDULE:
2009-2012



Early warning and monitoring of natural disasters and assessment of caused damages

Exploration and extraction of minerals and energy resources

Ecology monitoring

Monitoring of forest and steppe fires

Mapping

Registering, planning, controlling of land and forest use

Monitoring of agricultural and forest land status

Ground stations

Data receiving ground stations

Data transfer

Flight and equipment handling

Flight control center

Data transfer to users

Internal information exchange

Survey planning and internal information exchange

Data receiving, processing and distribution center

Internal and specific information exchange

Information and analysis center

Organs of the Government of the Republic of Kazakhstan

Official governmental bodies on the regional level

Enterprises and organizations

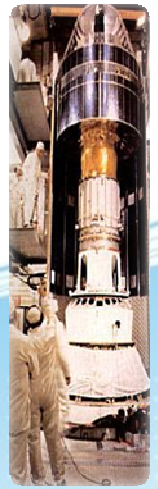
Scientific institutes

ASSEMBLY & TESTING COMPLEX

PROJECT GOAL: **Creation of the modern hi-tech enterprise for designing and manufacturing of space systems**

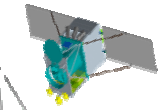
PROJECT TIME SCHEDULE: **2009-2012**

PROJECT RESULTS: **Real assembling & testing works – from 2012**



Designing

3 TON



Assembling and testing of spacecrafts weighing up to 3 tons

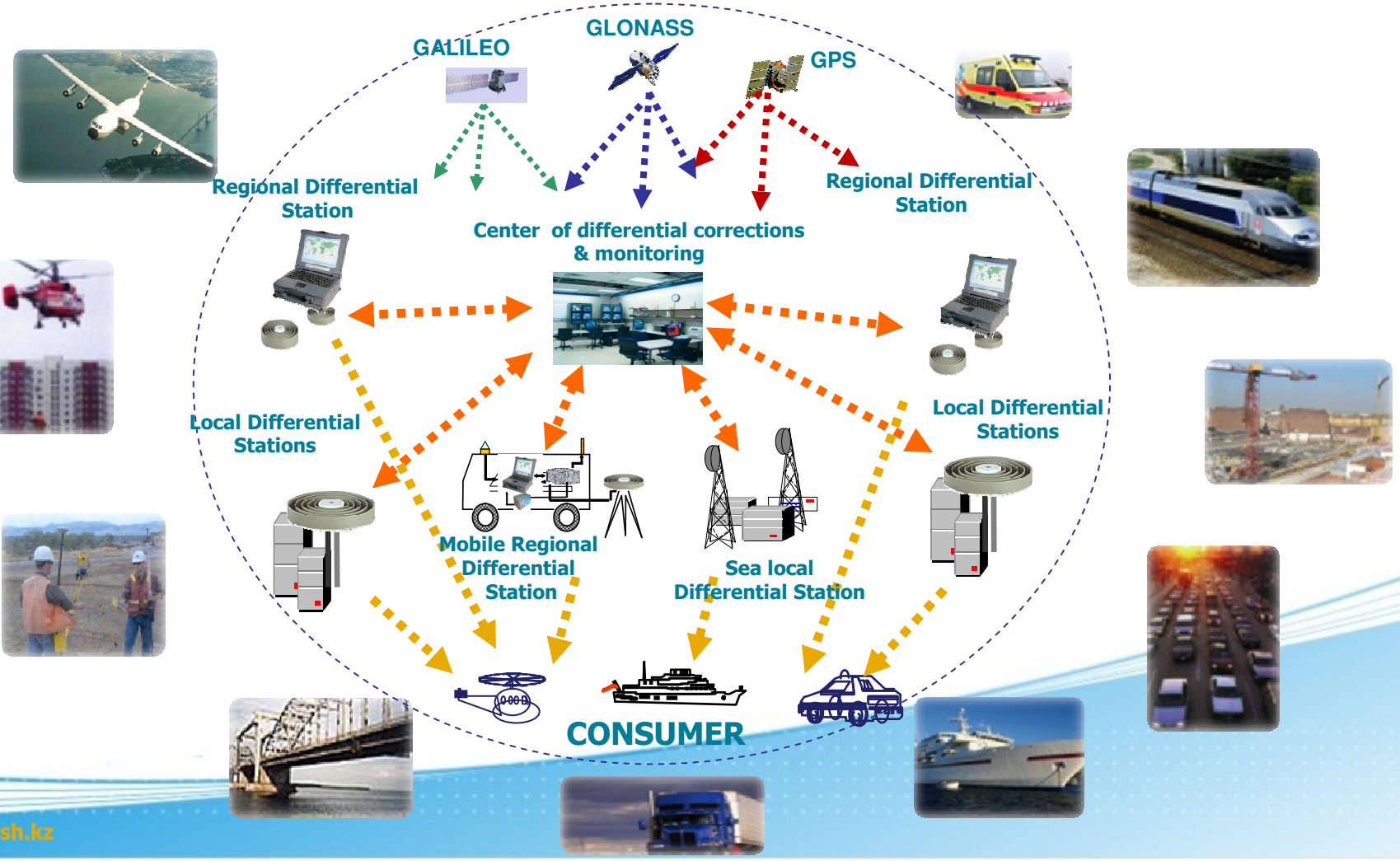
6 TON

Increase in weight and dimensional characteristics up to 6 tons

High-accuracy Satellite Navigation System

PROJECT GOAL:

Creation of the conditions for the guaranteed reception of qualitative real time- coordination and navigation services by consumers within the overall territory of the Republic of Kazakhstan.



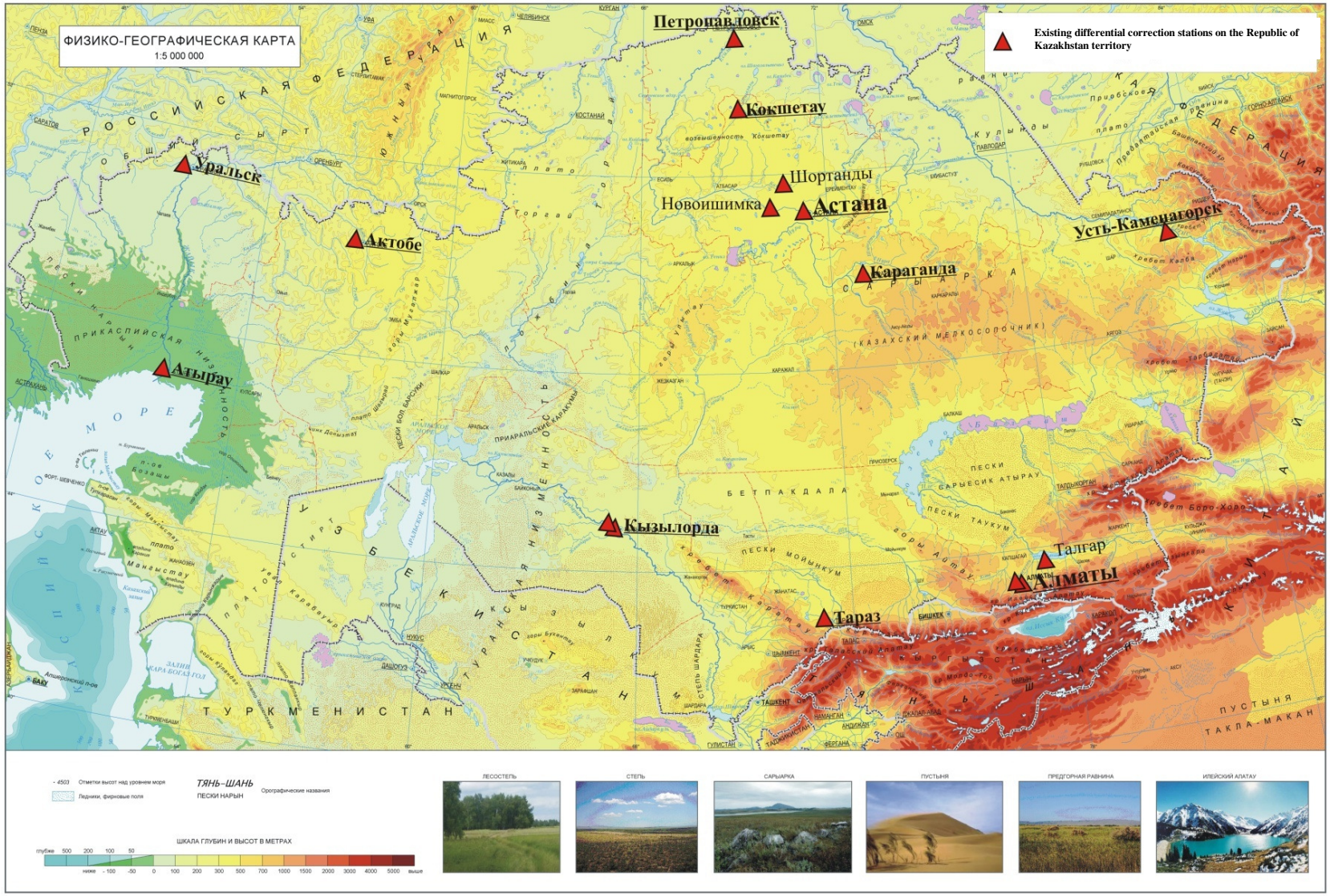
Ground-based infrastructure of DGNSS RK

- infrastructure preparation and distribution to consumers of differential correction information that will provide system users with increase in coordinate determination accuracy up to demanded level;
- monitoring of satellite radio-navigation systems with the purpose of timely caution of users about infringements in their works;
- creation of the National operator of GNSS functional applications.

Existing ground-based infrastructure of differential stations

- Now there are more than 20 local differential stations and the permanent seismic stations network functioning in the different regions of the Republic of Kazakhstan
- «National Company «Kazakhstan Gharysh Sapary» is aimed at single navigation field creation in all territory of the Republic of Kazakhstan and integration of all existing stations into single high-precision navigation system within the project «Creation of ground-based infrastructure of DGNSS RK»

Existing differential correction stations on the Republic of Kazakhstan territory

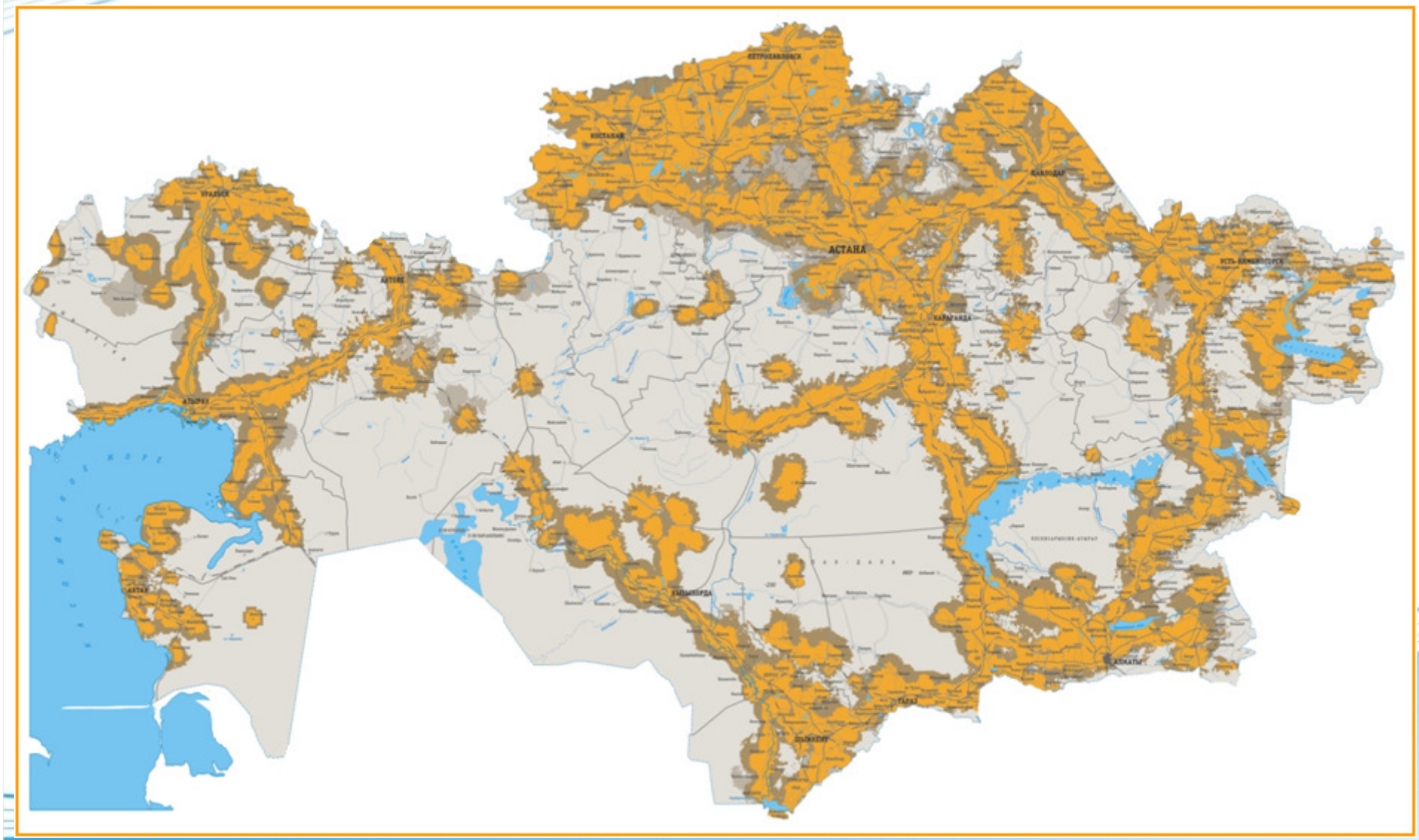


Ground-based infrastructure of DGNSS RK

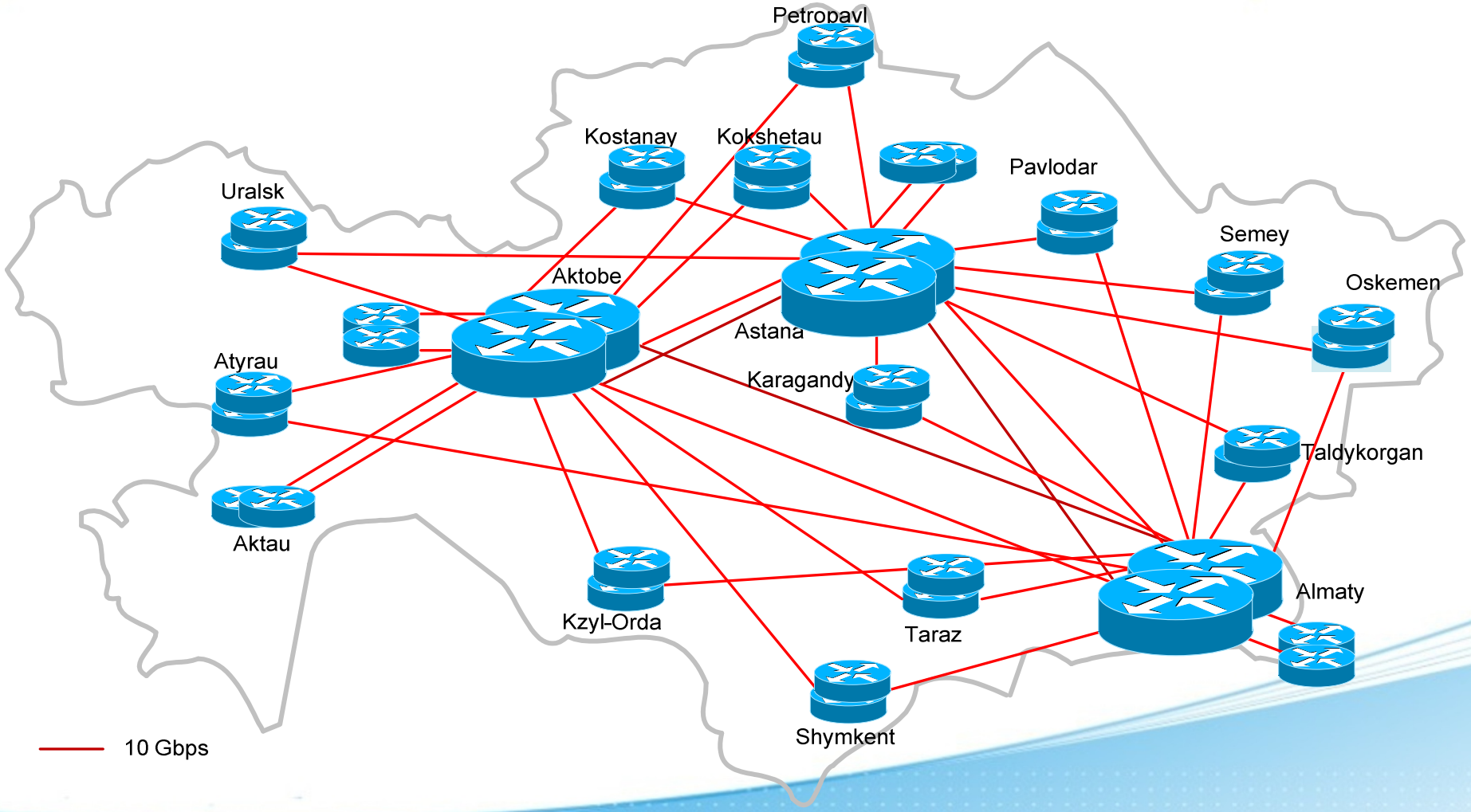
❑ **For creation of high-precision navigation system Kazakhstan has all necessary resources, which are:**

- GSM infrastructure presence, radio station of ultrashort waves range for granting the differential correction data to consumers and covering all necessary zones of Kazakhstan, and also possibility of granting the data by the geostationary satellite;
- high-speed and highly reliable, ground-based and satellite communication channels for data transmission between system parts.

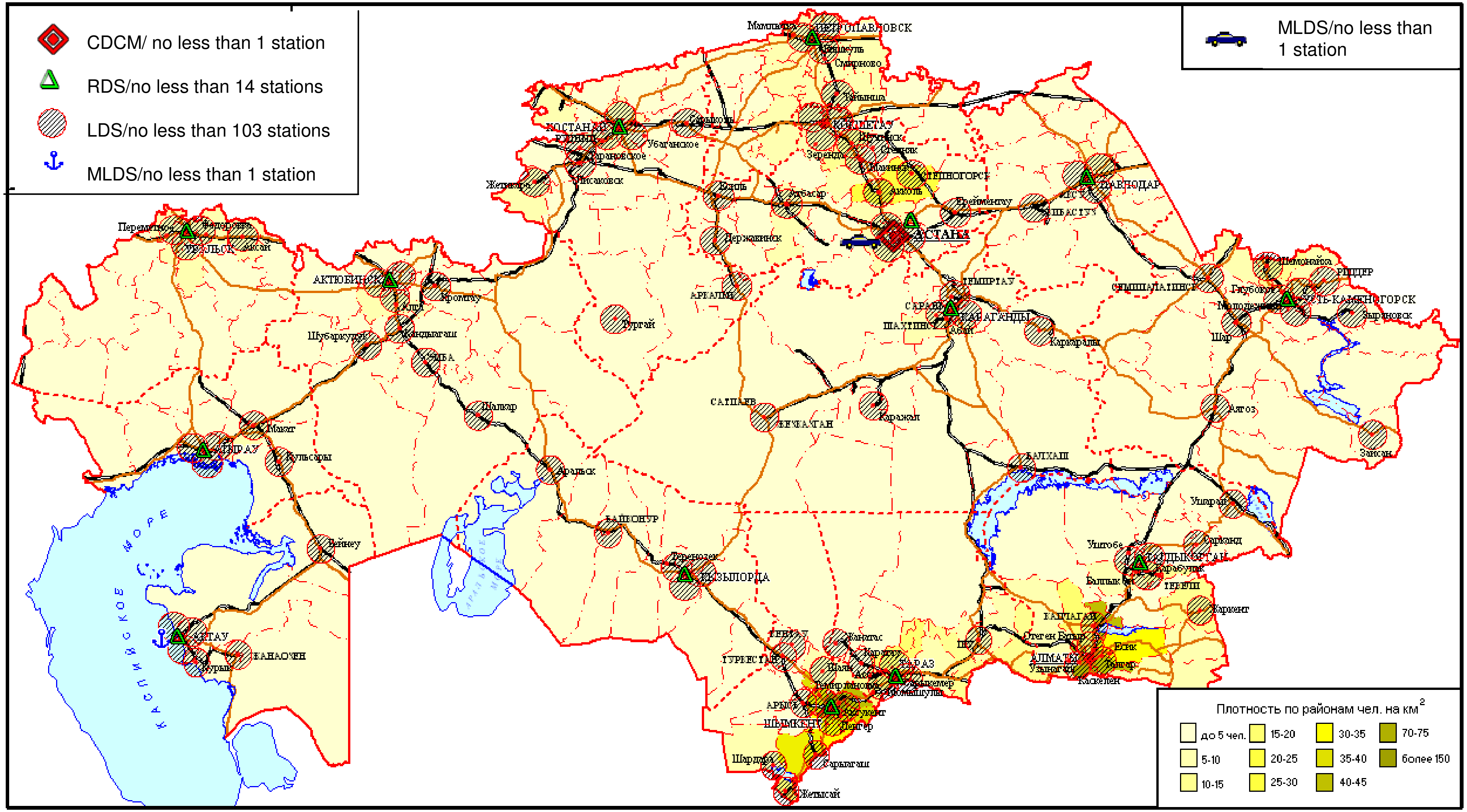
The scheme of GSM-communication coverage over the Republic of Kazakhstan territory



High-speed backbone for data transmission (10 Gbps)

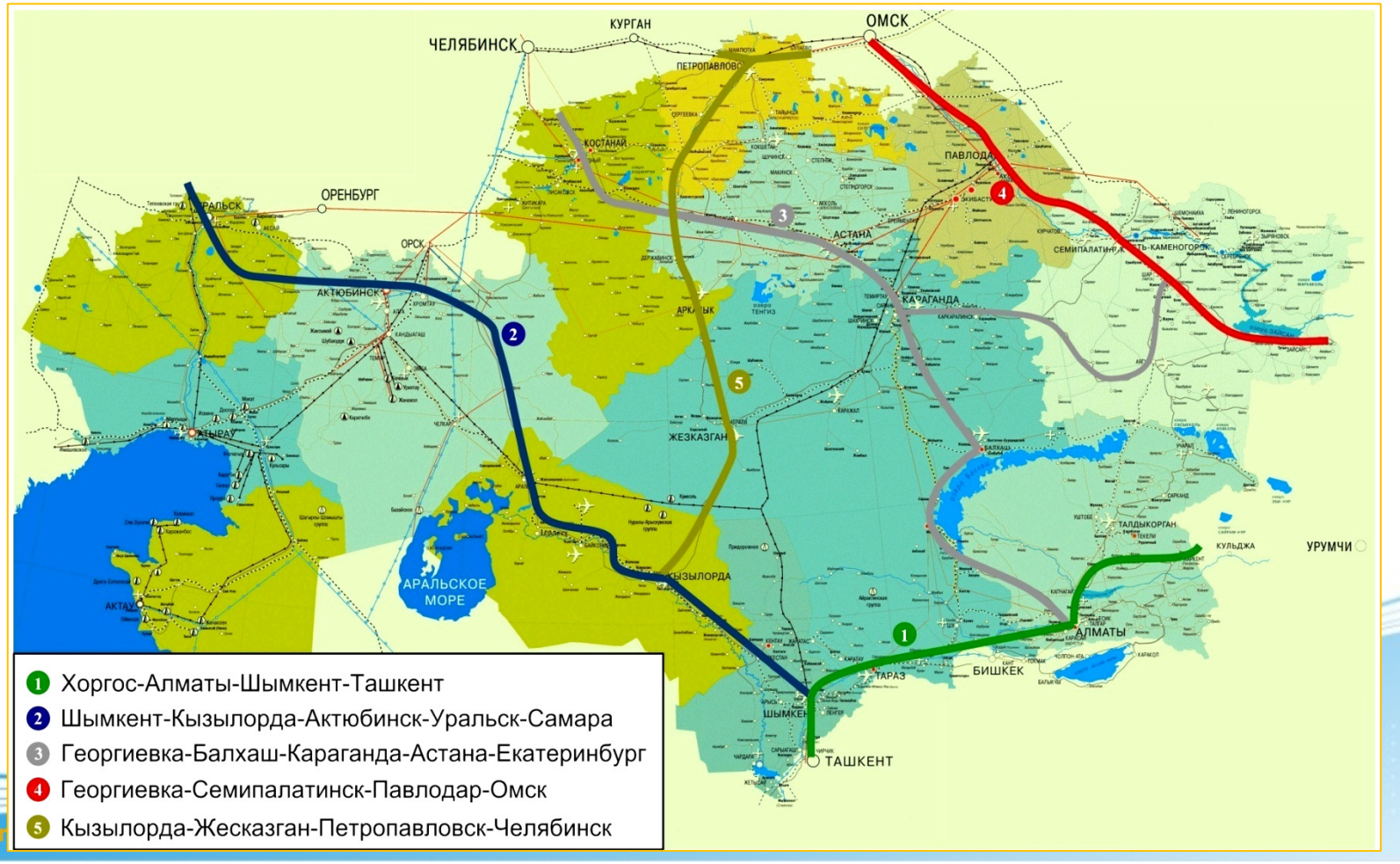


Preliminary allocation of the ground-based segment elements of DGNSS RK in a view population density

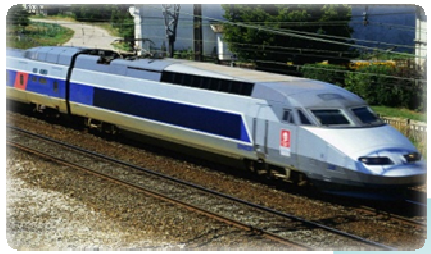


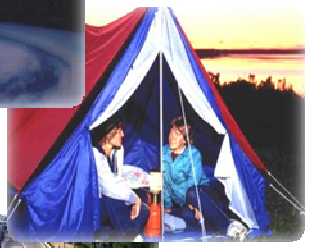
Existing and planned transport corridors in the Republic of Kazakhstan territory

The differential stations network of DGNSS RK will provide favorable conditions for the decision of geodetic, building and other problems in realization of transport corridors Horgos - Tashkent, Shymkent - Samara, Georgievka - Yekaterinburg, Georgievka - Omsk, Kyzylorda – Chelyabinsk, etc.

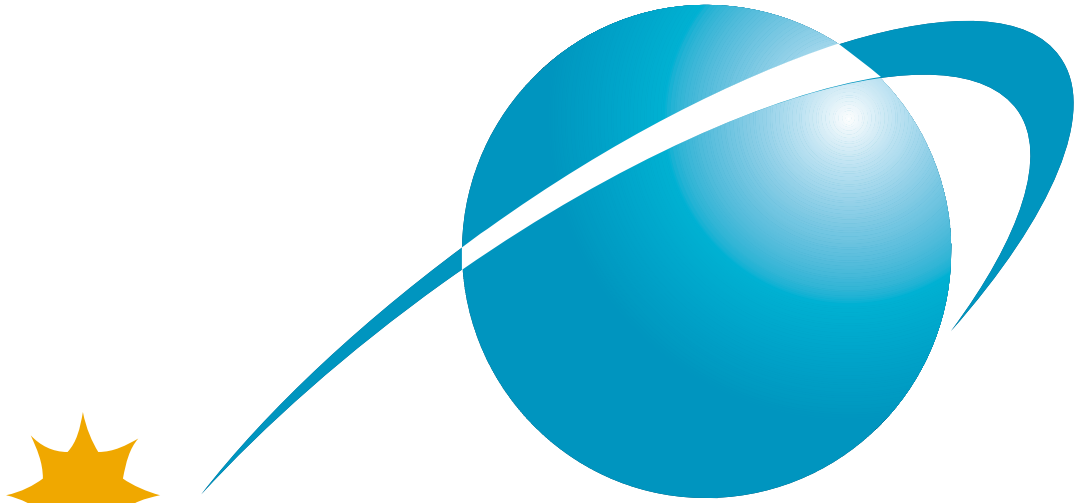


The basic application areas of DGNSS RK





- precise mapping and geodesy;
- land management and cadastre;
- agriculture;
- all-weather navigation;
- traffic stream management;
- route optimization;
- traffic control systems;
- support of passengers' safety;
- support of construction works;
- decreasing the time for search-and-rescue operations;
- national safety;
- and so on



ҚАЗАҚСТАН

ҒАРЫШ САПАРЫ

Thank you!