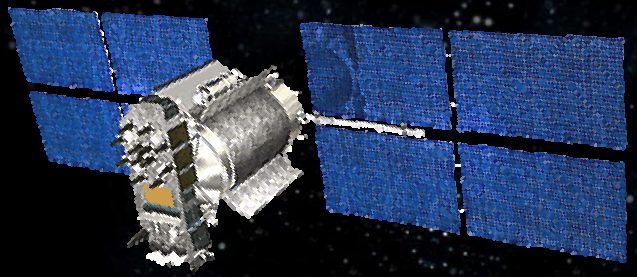
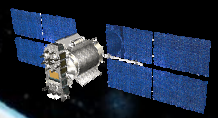
Main GLONASS applications in the Russian Federation





Dr. Mark Shmulevich,

Head of business development,
JSC «Russian Space Systems»

Essential GNSS Application Areas

Security Provision

Military force

Enforcement of law

EMERCOM

Synchronization of communication and energy systems

Monitoring of engineering structures, construction

Geodesy and mapping

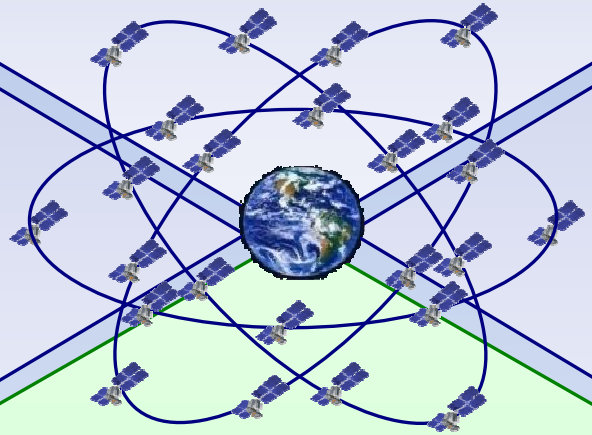
Aviation

Marine

Railway transport

Science

Geographic information system



Transport

Environmental protection

Passenger transportation

General applications

Agriculture

Tourism

Insurance

Alarm system

Alarming button

Personal car

Freight

Effects of GNSS Adaption

Social effect (ex.)

- ensuring additional security of life
- social services improvement
- increase in quality of life

Management Effect (ex.)

- service quality control
- efficiency of social programs

Economic effect (ex.)

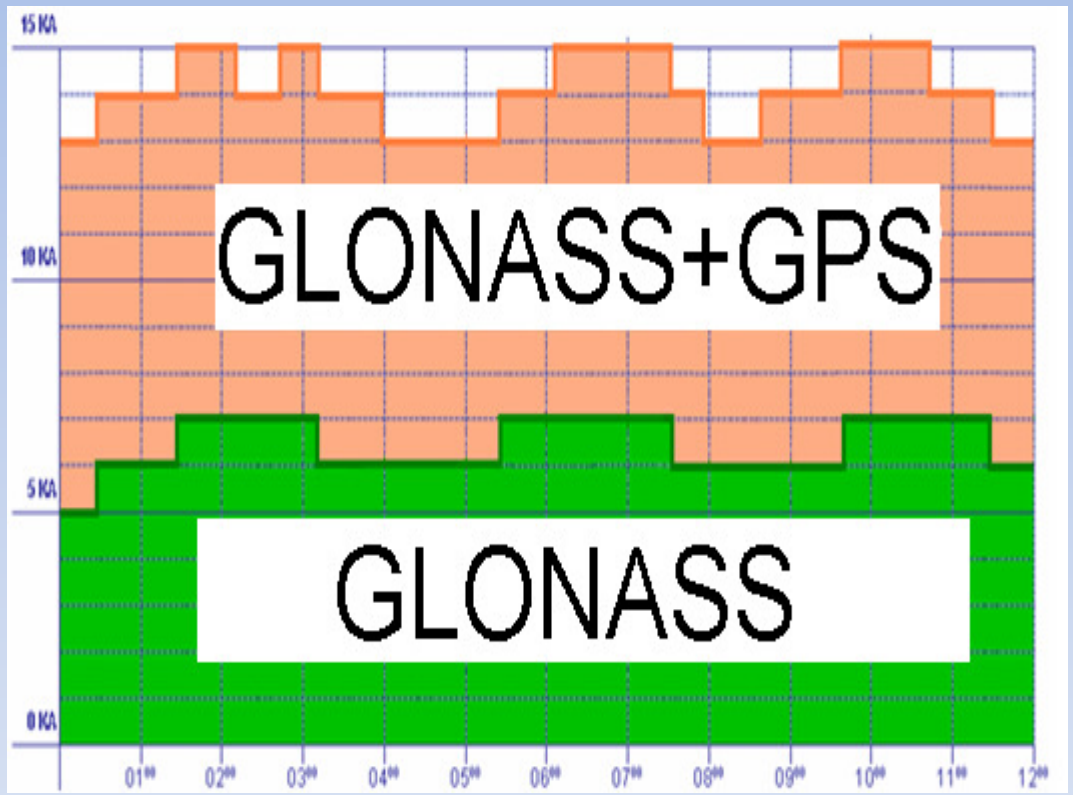
- reducing negative impacts on the environment
-saving 30% of funds for the maintenance of transport
- greater performance

Utilization of satellite navigation technologies provides increase in efficiency and competitiveness of national economy

Benefits of Combined use

- Improved availability in city canyons
- Increased robustness in interfering conditions
- Reduced risk of political dependence on the only provider

Availability increase in Moscow, 2009-2010



Use of GLONASS + GPS provides much better results for many applications than mono system use

Example of GPS/GLONASS module tests in Dallas, USA

GPS

Yellow dots – data about track made by GPS receiver. The receiver sees from 4 to 6 satellites

GPS / GLONASS

Blue dots - data about track made by GPS/GLONASS receiver. The receiver sees from 8 to 12 satellites

Advantages of GPS/GLONASS use:

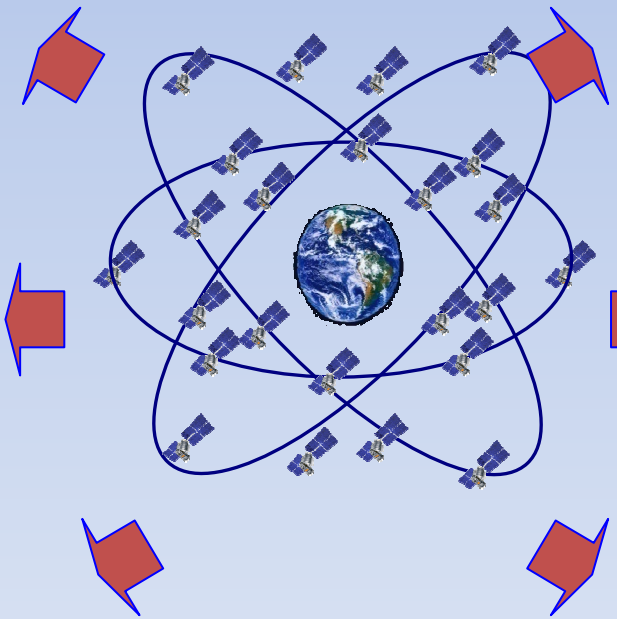
- ”double proof” — double warranty of positioning when satellites of one system does not work;
- when the reception is bad;
- allow to «catch» the signal even in buildings near windows and in city;
- in northern hemisphere GPS may work worse then GLONASS;
- during mass production variation in prices will not exceed 10% of the price of GPS and GPS/GLONASS navigator;
- low price of GPS/GLONASS in future.

Directions of GPS/GLONASS civil technologies development

Corporate vehicle monitoring system development (GMK Norilsk Nickel, FSUE Russian Post etc.)

Regional projects: navigation and information systemsdevelopment

GPS/GLONASS telematics equipment mass production



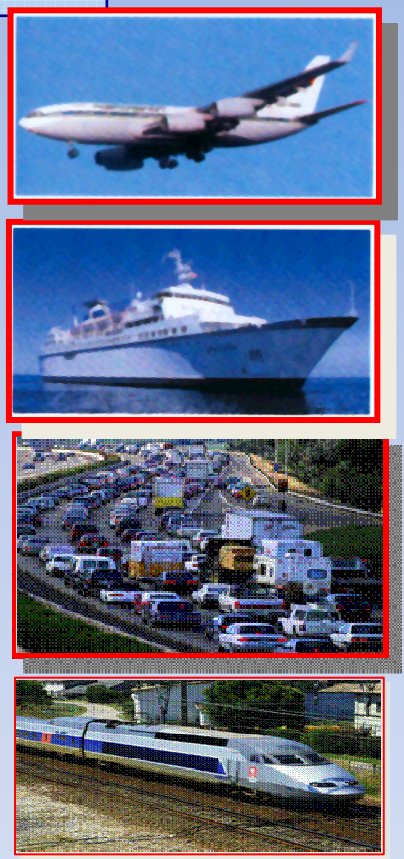
GPS/GLONASS car equipment development and installation (VAZ, GAZ, KAMAZ)

PND (GPS/GLONASS) development

Pilot projects in navigation and information system development for Russian government bodies

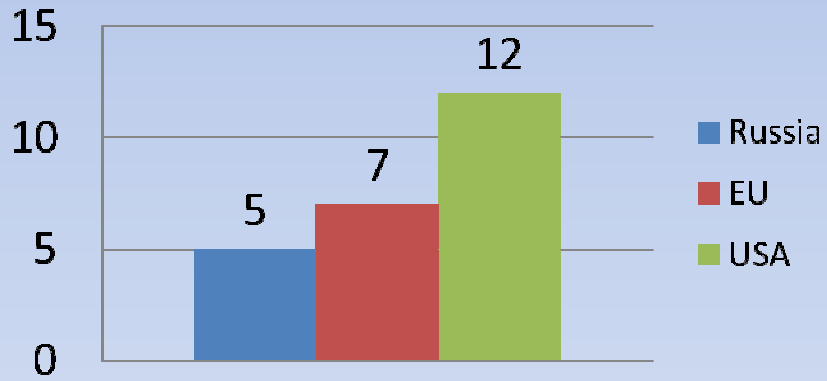
GLONASS for State Transportation Industry

Civil aviation	
equipped aircrafts	**23%**
Marine and river fleet	
equipped vessels	**87%**
Automobile transport	
equipped special vehicles	**>65%**

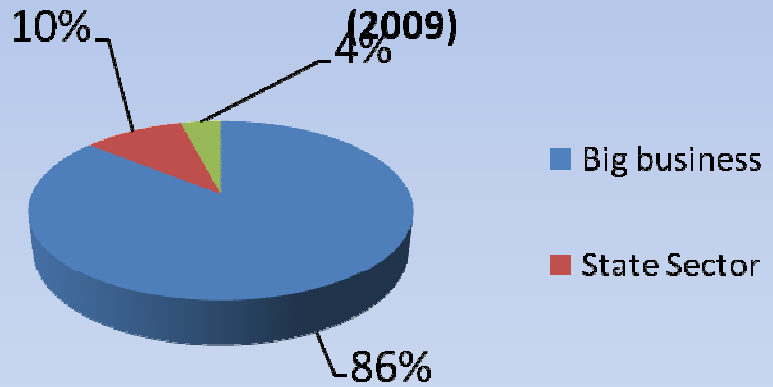


GLONASS for commercial Transportation Industry

Saturation of the navigation equipment for commercial transport industry market (%) by 2011



Automobile transport, equipped with satellite transport monitoring systems (2009)



Increase in the service market for satellite monitoring of transport (per year)

- USA 50-70 %
- EU 50-70 %
- **RUSSIA** 100 %

Russian commercial automobile park: about 8,3 million units by the end of 2009

ERA GLONASS - main objectives

Emergency response system in case of accidents in transport, based on the installation of terminals in the cars, which determine the coordinates of the victim's car with the help of the GLONASS system and transmit data about the emergency to operator

Main objectives of «ERA-GLONASS» system

- Transmission of the information about the accident to emergency service
- Assurance of minimum set of data transmission from the terminal equipment to emergency service
- Providing two-way voice communication between emergency operator and driver involved in an accident
- Monitoring the status of the terminal equipment and response in case of emergencies

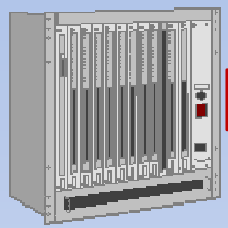
ERA GLONASS - Principle of Operation

GLONASS spacecraft

GPS spacecraft

GSM, GPRS, P2P radio, satellite communication

Server



Control center

Signals to emergency services

Accident location and time

911

Telematics module

Ambulance

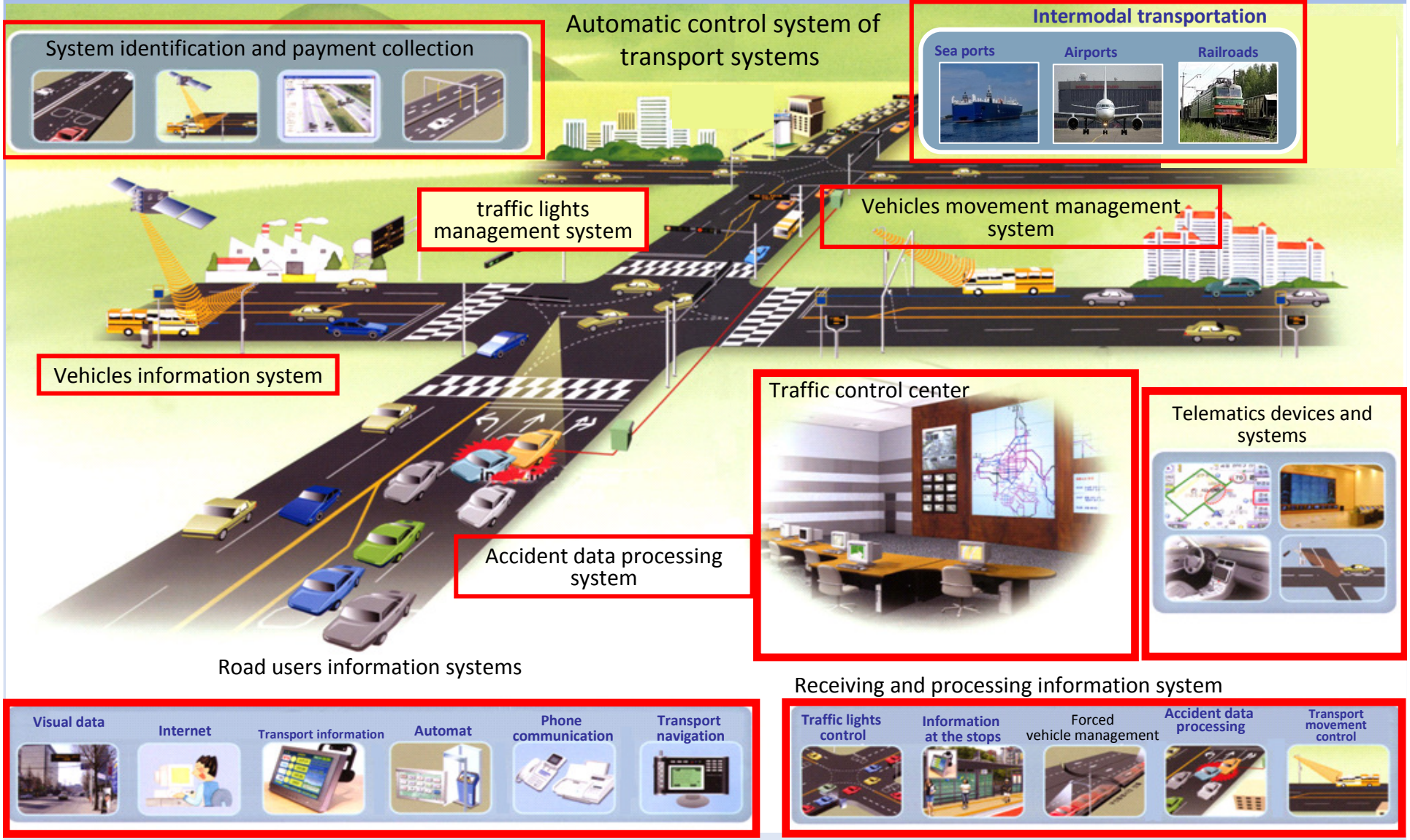
Police

Emergency repair service

Functions of ERA GLONASS:

- Communication of accident location coordinates to control center
- Vehicle movement parameters control
- Theft prevention
- Navigation
- Loudspeaker communication

GLONASS technology - the basis of intelligent transportation system (ITS) in Russia



Intelligent Transportation Systems (ITS) – main objectives

Punctual public transport movement schedule: delay no more than 5 minutes.

Reducing the time by public transport to 25-30%

Exact information about public transport timetable («intelligent stops»)/ Wide choice of transport

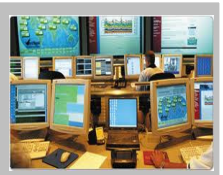
ITS results

- **High quality of public transport services**
- **Safety and quality of life**
- **More effective management**

First aid time reduction to **30%**

Ecology level improvement (reducing emission , less noise) 10%

Permanent public transport management in Moscow city and region.



The ITS targets:

- Reducing the number of road accident : **52%**
- Reducing the number of road accident deaths : **20%**
- Travel time reduction: **20%**
- Increase public transport average arrival time: **35%**
- Reducing emission: **8%**

The basic structure of the Intelligent Transportation Systems (ITS)

Stationary objects monitoring data

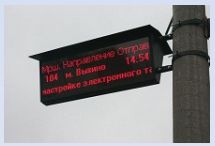
Software and hardware of ITS

Subsystem of traffic control means management

Analysis center

Mobile objects monitoring data

Subsystem of transport infrastructure status information



ITS –Moscow project

2011-2012: 24 000 transport units

Phase 1
until 15.12.2011

- setting control center
- supply 7000 vehicles of SUE «Mosgortrans» with equipment
- 600 «intelligent stops»
- passenger traffic monitoring

Phase 2
until 30.06.2012

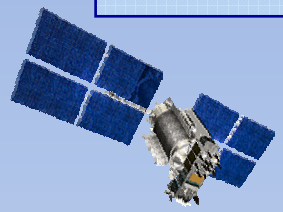
- further development of a control center
- supply 9000 commercial transport units with equipment
- +400«intelligent stops»

Phase 3
until 15.12.2012

- further development of a control center
- supply 8000 transport units working on Moscow-Moscow region-Moscow route with equipment
- +200 «intelligent stops»

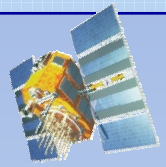
ITS Traffic control system improves safety of passenger transportation in Moscow

Examples of GLONASS/GPS equipment installation on commercial and state transport



GLONASS

GPS



Intellectual Transport System in city of Dubna

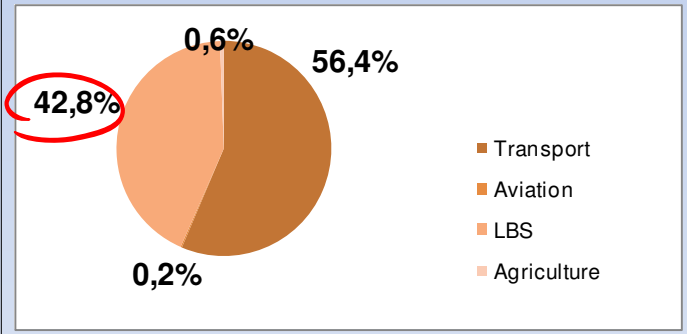
System for mobile groups management in the city of Moscow

MMC Norilsk Nickel

Status and prospects of LBS market in the world and in Russia

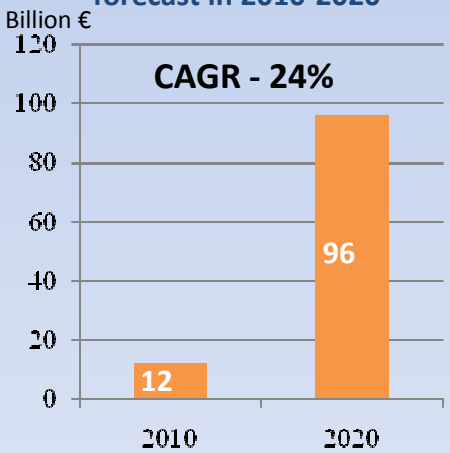
- LBS market will increase from €12 billion in 2010 to €96 billion by 2020 (CAGR 24%)
- LBS future– geotarget advertisement (LBA) and local search
- By 2014 there will be 1,4 billion LBS users in the world, 780 mln. of whom will get LBA.
- Russian market rapidly grows. The size forecast as $158 mln. in 2014.

Navigation and information market segments in 2010-2020



Source: European Commission, 2010

Global LBS market growth forecast in 2010-2020



Source: European Commission, 2010

The most popular LBS services

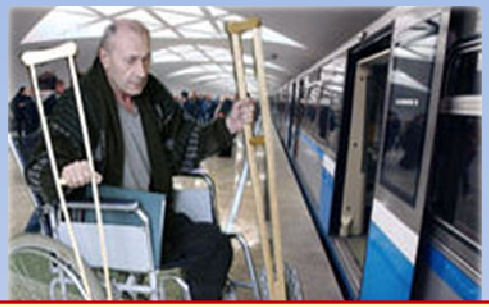
Service	Popularity
Navigation	70%
Weather forecast	46%
Traffic jams information	38%
Restaurant reviews	38%
Local search (coffee shop, tank, etc.)	36%
Offers/coupon/local shops discounts	33%
Next ATM search	26%
Cinema schedule	22%
Local news	20%
Geolocal social networks	18%
Games	10%
Geotegging advertisement	6%
Improved emergency services call	5%
Children positioning	3%
Others	6%

Source: Cross-Tab Marketing for Microsoft, 2010

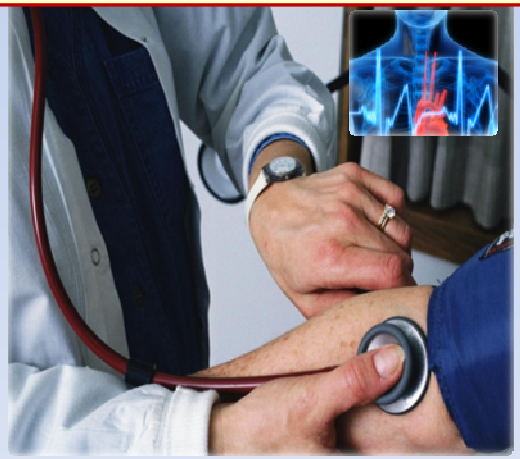
LBS – the second largest segment (~43%) of the global navigation and information market. There is the explosive growth in LBS market in the next few years.

Social GLONASS Project

Social services quality improvement with the help of GLONASS technologies and monitoring systems application



- By 2015 the number of disabled people will exceed 15 million
- The number of disabled people in Moscow exceeded 1,2 million, including 26 000 children. More than 60 000 people don't leave their houses



Convention on the Rights of Persons with Disabilities was adopted in 2006 at the United Nations Headquarters. It was signed by 95 states, including Russia

Social GLONASS Project Structure

Social GLONASS System Structure

Subsystem “Assistant”

Where is the help?
Who soon will it come?
…



Subsystem “Guide”

Where to go?
Which way to go?
…


Subsystem “Monitor”

How are you feeling?
What do you need now?
…


Subsystem “Inspector”

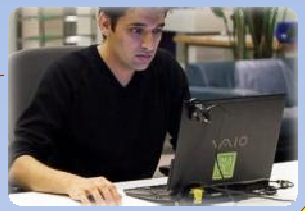
Is transportation done safely?
Have the kids left the zone of monitoring?
…



Social GLONASS Subsystem: “Assistant” Project

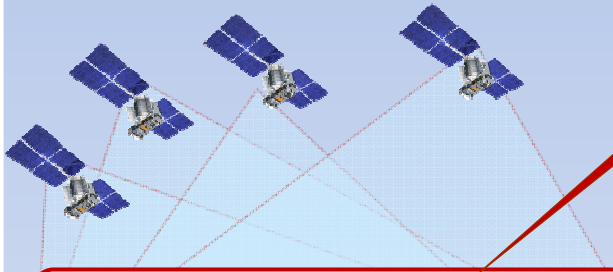
Navigational and informational support system + system of urgent assistance for disabled people

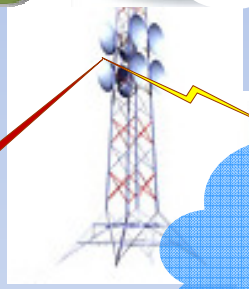
terminals



Operator

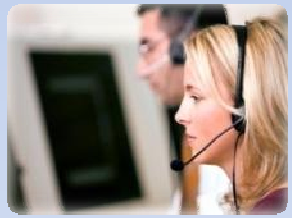
Technical assistance

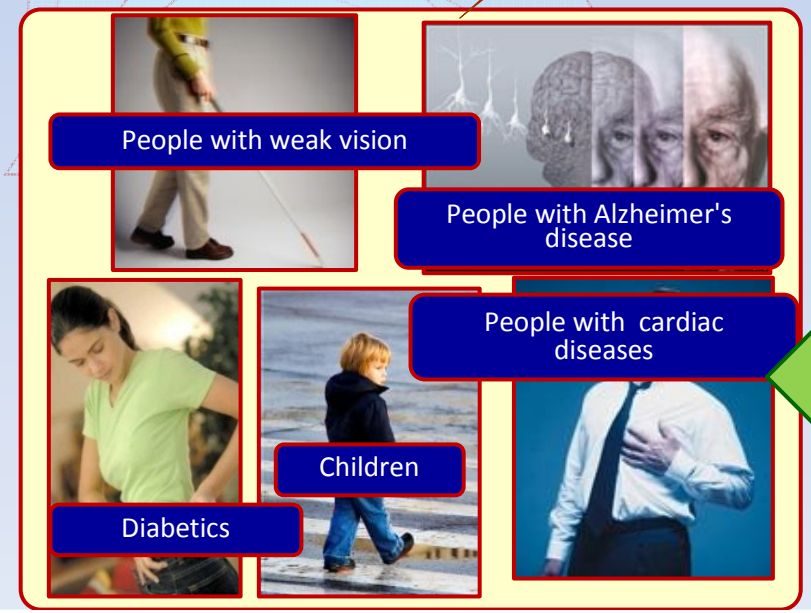




Computing infrastructure based on virtualization algorithms

Local medical institution





Medical assistance group

EMERCOM services

Social GLONASS Project Infrastructure Samples

“Intellegent bus stop” system

Specially equipped transport

Disabled people informing about arrival time of transport (including specially equipped one)

Calls to situational centers and EMERCOM services with the help of “alarming button”

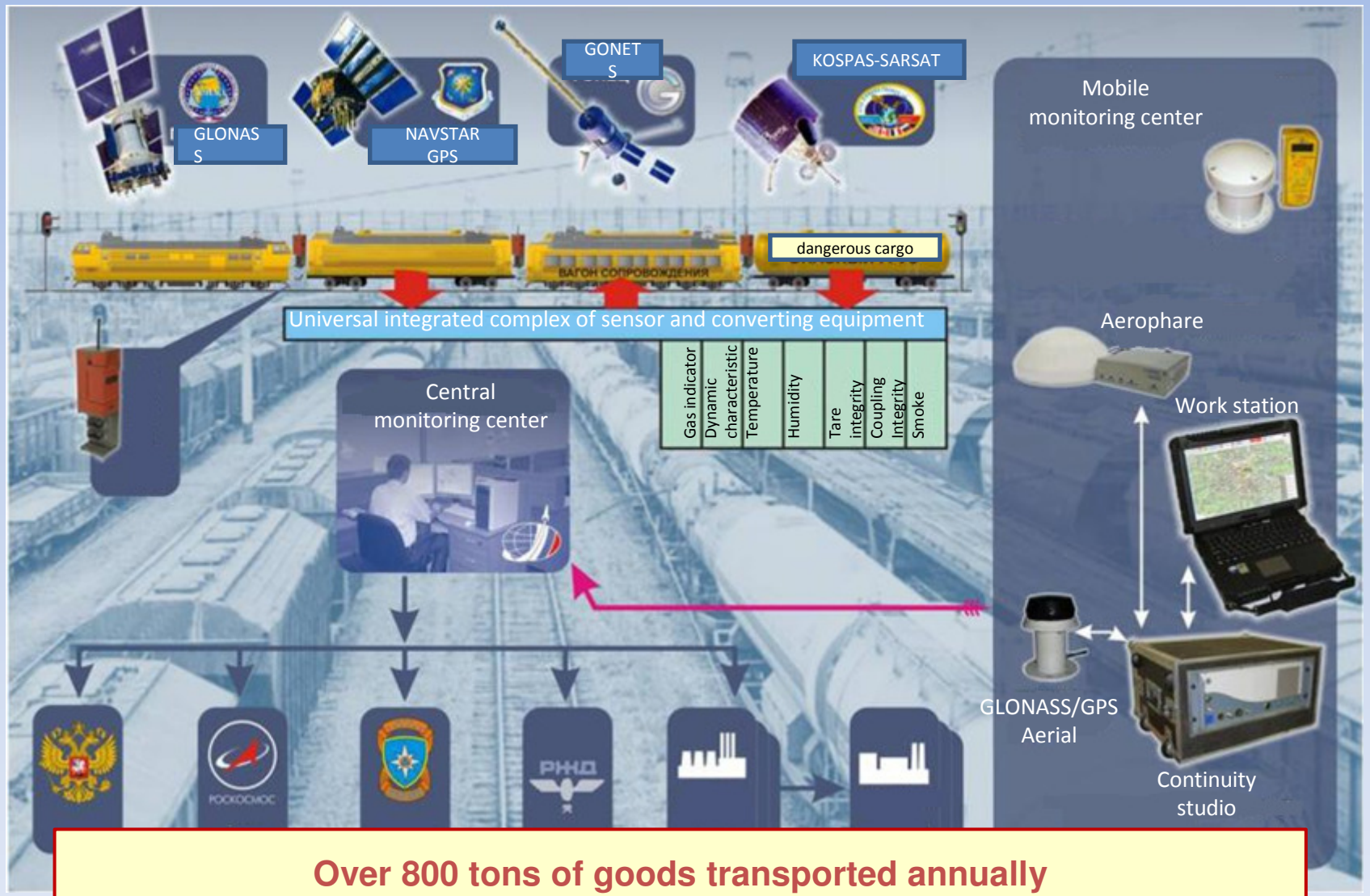
Traffic lights with sound signal system

Traffic lights with sound signal for disabled people

Individual navigation devices with voice interface. Lining of safe routs. “Alarming button”

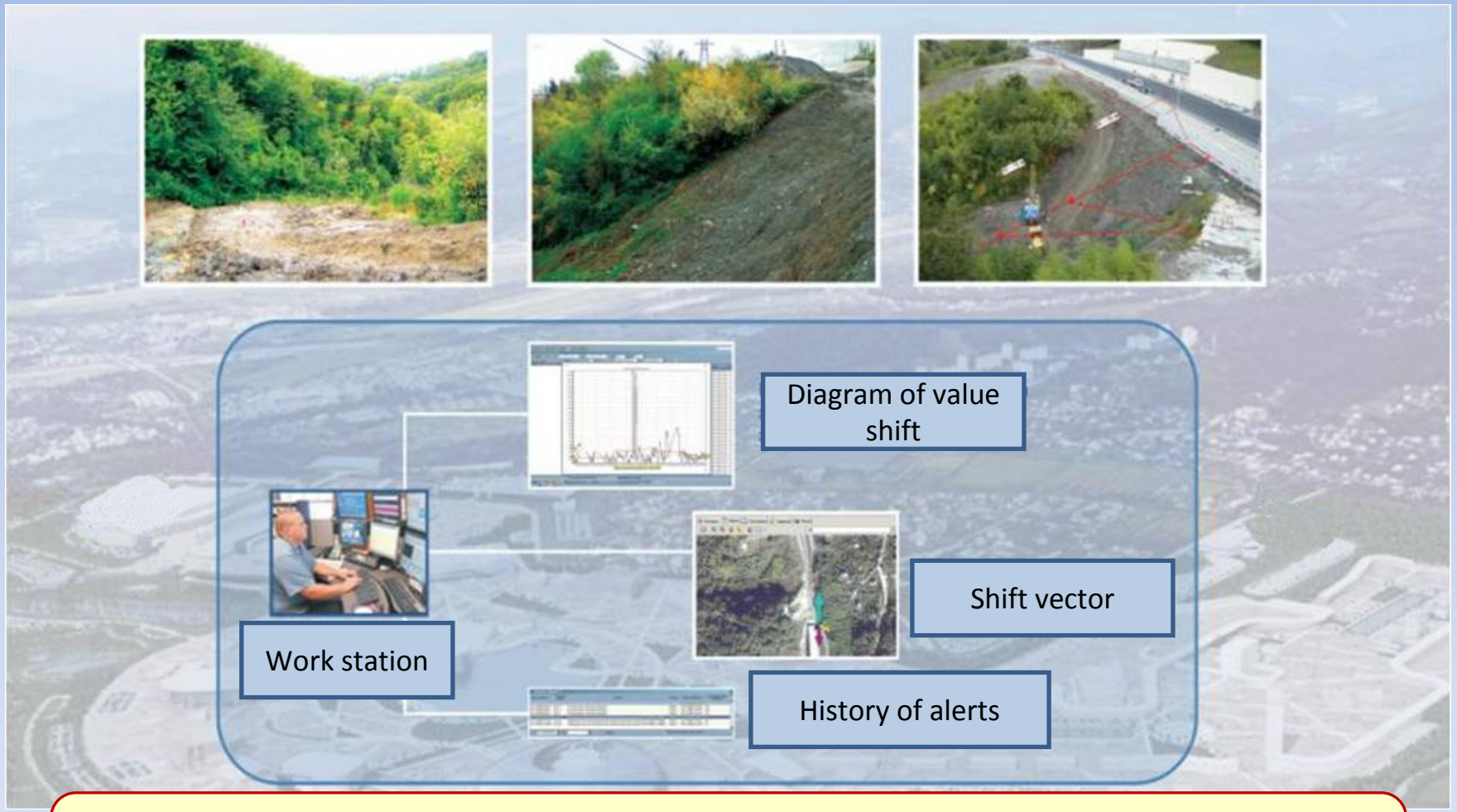
Complex solution of social problems and transport safety challenges will decrease the number of road incident with disabled people participation

Hazardous Goods Monitoring and Control System



Over 800 tons of goods transported annually

Mountain Slopes High Precision Positioning Monitoring System



- Remote monitoring of landslide processes in real time
- On-line communication of slope condition data to control center
- Immediate warning system about significant rock displacement

Fuel and Energy Complex Parameters Monitoring and Control

Systems: antiseismic protection of reactor, fuel-handling machine control, reactor safety, turbine protection, backup diesel generator protection

More than 100 sensor types including displacement transducers with GLONASS support

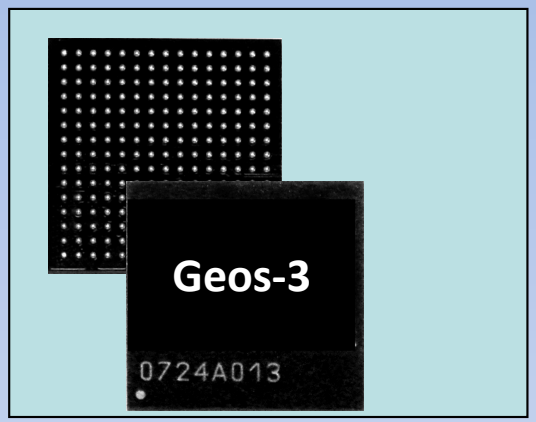
Already implemented at:

- Nuclear power plants: Balakovskaya, Volgodonskaya, Kalininskaya, Novovoronezhskaya, Kurskaya, Leningradskaya, Kolskaya (Russia), Rovenskaya, Hmelnitskaya, Zaporozhskaya, Yuzhno-Ukrainskaya (Ukraine), Kozloduy (Bulgaria), Busher (Iran), Kudankulam (India), Tanvan (China)
- 80 gas transfer and 60 oil transfer stations
- 6 power generating units at Surgutskaya power plant

Russian GLONASS/GPS receiver Geos-3

Geos-3: modern characteristics and considerable advantages:

- High miniaturization level
- Low cost in mass production
- GLONASS/GPS mode



Technical characteristics

Chipset 10x10mm, module 15x20 mm

Power consumption less than 100mWt

Cost ~15$

Benefits of GLONASS/GPS receiver Geos-3

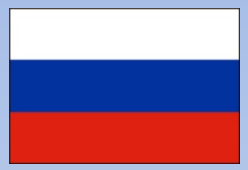
Geos-3

- GLONASS navigation integrated with GPS navigation increases the reliability of navigation data
- Power consumption in GPS mode and in GLONASS mode are equally low
- Software was developed on the basis of the solution tested by previ ous generations of GLONASS / GPS receivers

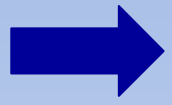
Main Competitors

- The mode is applied in which the GLONASS and GPS are processed not simultaneously in FDMA
- Power consumption in GLONASS mode is doubled
- There is no tested software

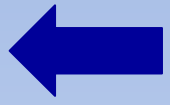
Examples of international cooperation in the field of satellite navigation



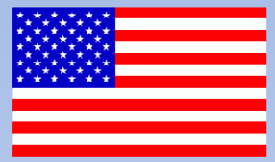
JSC « Russian Space Systems»



RUSNAVGEOSET



Trimble Navigation, Ltd.



The main goal : establishment infrastructure of high-precision positioning for civilian users in Russia and CIS

The strategic goals a company:

- facilitating the commercialization of the GLONASS;
- increasing use of GNSS technologies in the Russian market;
- modernization of the technological infrastructure of the state.

Rusnavgeoset CORS – modern GLONASS / GPS / Galileo / Compass receiver for reference stations

Main applications of products:

- geodetic and cadastral works
- precise control of machines and mechanisms;
- monitoring of engineering structures.


THANK YOU
Dr. Mark Shmulevich