



Application of BDS/GLONASS technology in  
Three-Dimensional Multimodal Transportation

# BDS/GLONASS技术 在陆海联运中的应用

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# 1、 General Review

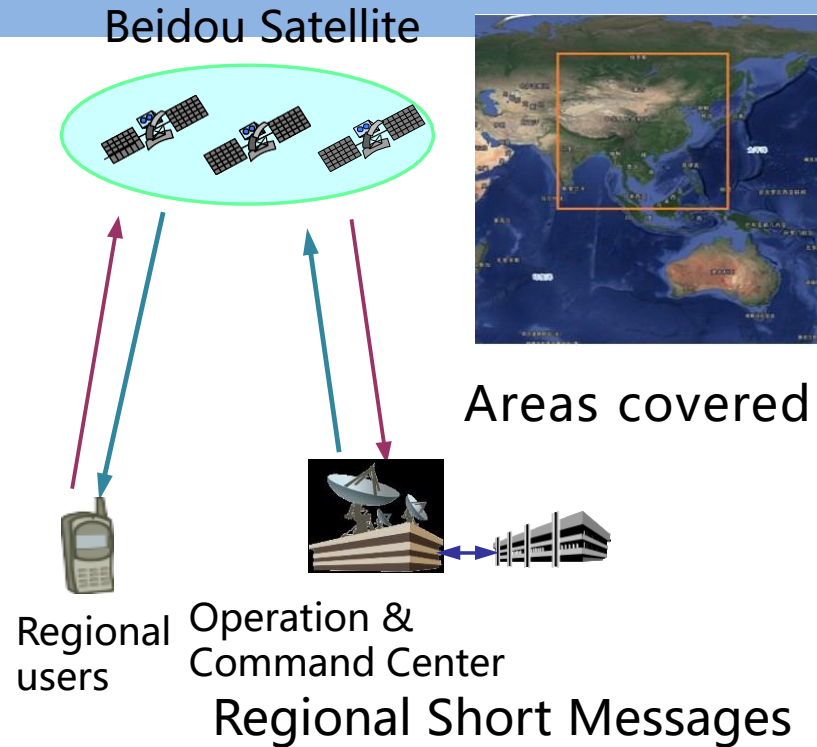
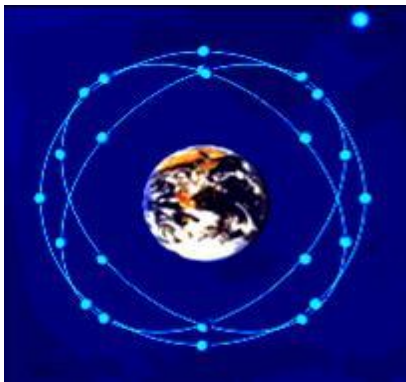
The BDS/GLONASS system are a global satellite navigation system independently constructed by Russia and China. In July 2020, China's Beidou-3 system started its global services providing.



GLONASS (RU)



BDS (CN)



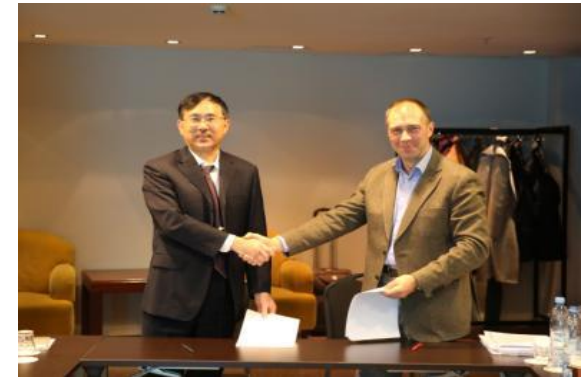
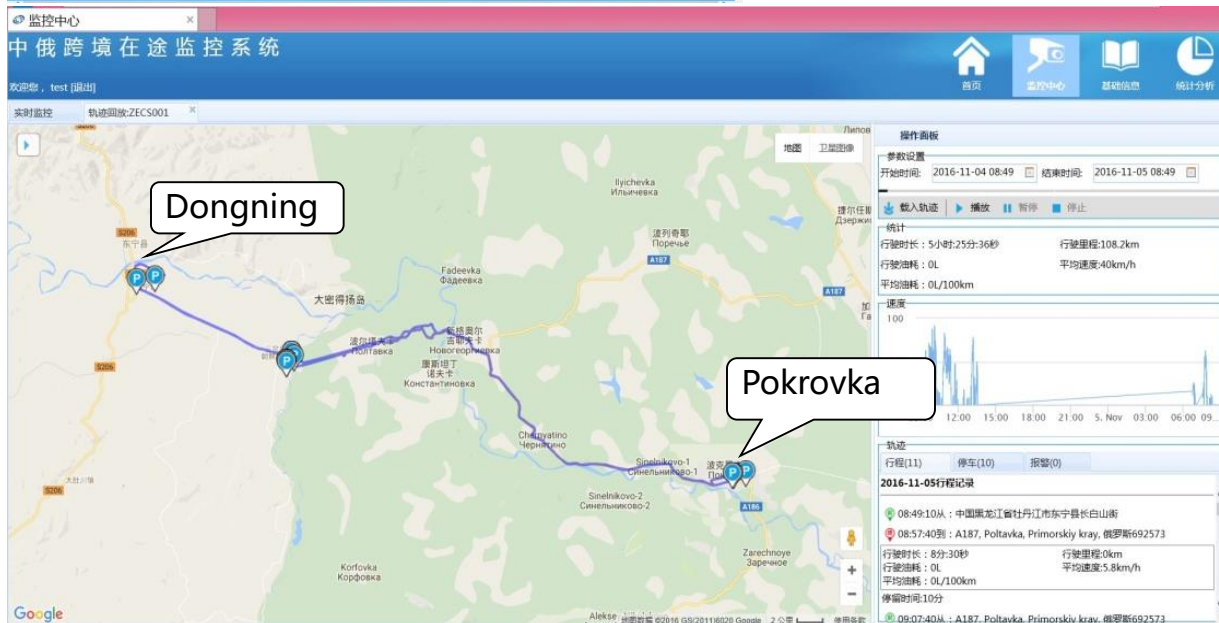
The system provides **positioning, timing, communication** and other functions. Among them, the regional and global short messages are important features of the BDS system, which realizes information transmission without conventional communication.

# 1、General Review

## China-Russia Cross-border Transport

### Cooperation Project

By far China and Russia have carried out many cooperations in satellite navigation. In the application of BDS/GLONASS technology in cross-border transportation, we've completed the construction of test areas in Dongning and Hunchun, and realized functions like exchange of basic data of cross-border vehicles, vehicle en-route monitoring.etc. Expansion of further applications is ongoing.



## 2、 Application in Three-Dimensional Multimodal Transportation

### Assist transportation intelligence and service capability improvement

Through the installation of BDS/GLONASS positioning, communication, information collection and other equipment, an information service platform is built to realize functions including location monitoring, transportation management and emergency warning of vehicles, goods, ships, etc.



Cargo truck  
China Railway  
Express  
Autonomous  
driving vehicles  
Maritime  
transportation  
...

Position reporting  
En-route monitoring  
Containers (items)  
tracking  
Emergency warning  
Transportation  
management  
Information exchange  
...

Assist transportation  
intelligence and service  
capability improvement:  
Improve transportation  
efficiency; reduce  
transportation time; save  
transit expenses; improve  
transportation safety, etc.  
...

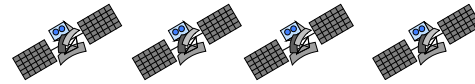
## 2、Application in Three-Dimensional Multimodal Transportation

Application in Vehicle and Maritime Transport

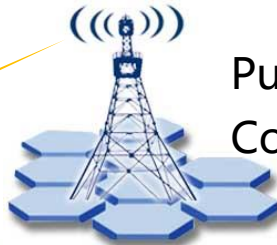
▣ Vehicle Transport

+Other Sensors

Terminal Device



BDS/GLONASS Satellite



Public Communication

Position reporting  
En-route monitoring  
Transport management



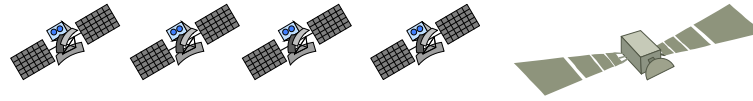
# 2、Application in Three-Dimensional Multimodal Transportation

## Application in Vehicle and Maritime Transport

### ▣ Maritime Transport

+ Other Sensors

Terminal Device



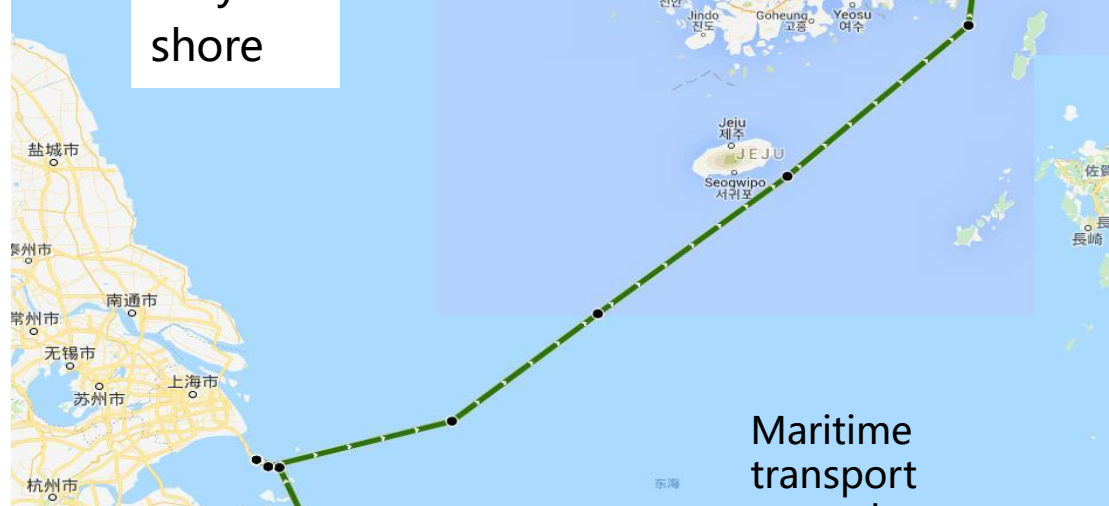
BDS/GLONASS Satellite

BDS short message communication  
Other satellite communication

Position reporting  
En-route monitoring  
Emergency warning  
Transport management



Public communication by shore



Maritime transport example

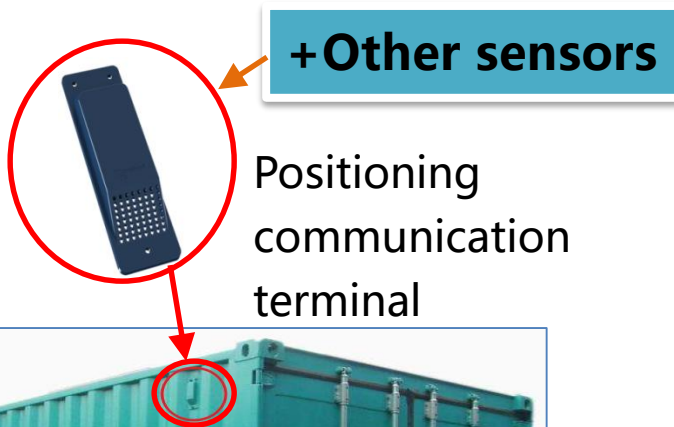
## 2、 Application in Three-Dimensional Multimodal Transportation

### Containers (Items) Tracking

Realize location reporting and item location monitoring and tracking.

By adding other sensors, temperature, humidity, speed and other information can be monitored.

By using the BDS/GLONASS system, the transportation process of containers truly becomes fast, transparent and visualized.



Positioning  
communication  
terminal





# 3、 Application in Autonomous Driving and Port Management

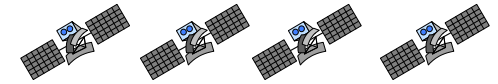
## Smart Wharf (Port): High-precision Positioning

Container loading & unloading  
Autonomous driving  
Ship docking  
Personnel dispatch

Improve working efficiency  
Reduce human cost  
Enforce safety management

**+Other equipment**

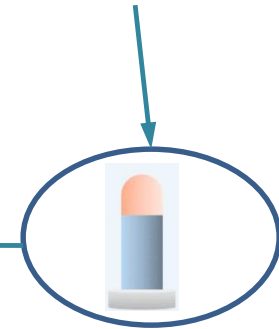
**High-precision positioning devices**



BDS/GLONASS Satellites



Public communication  
Private communication



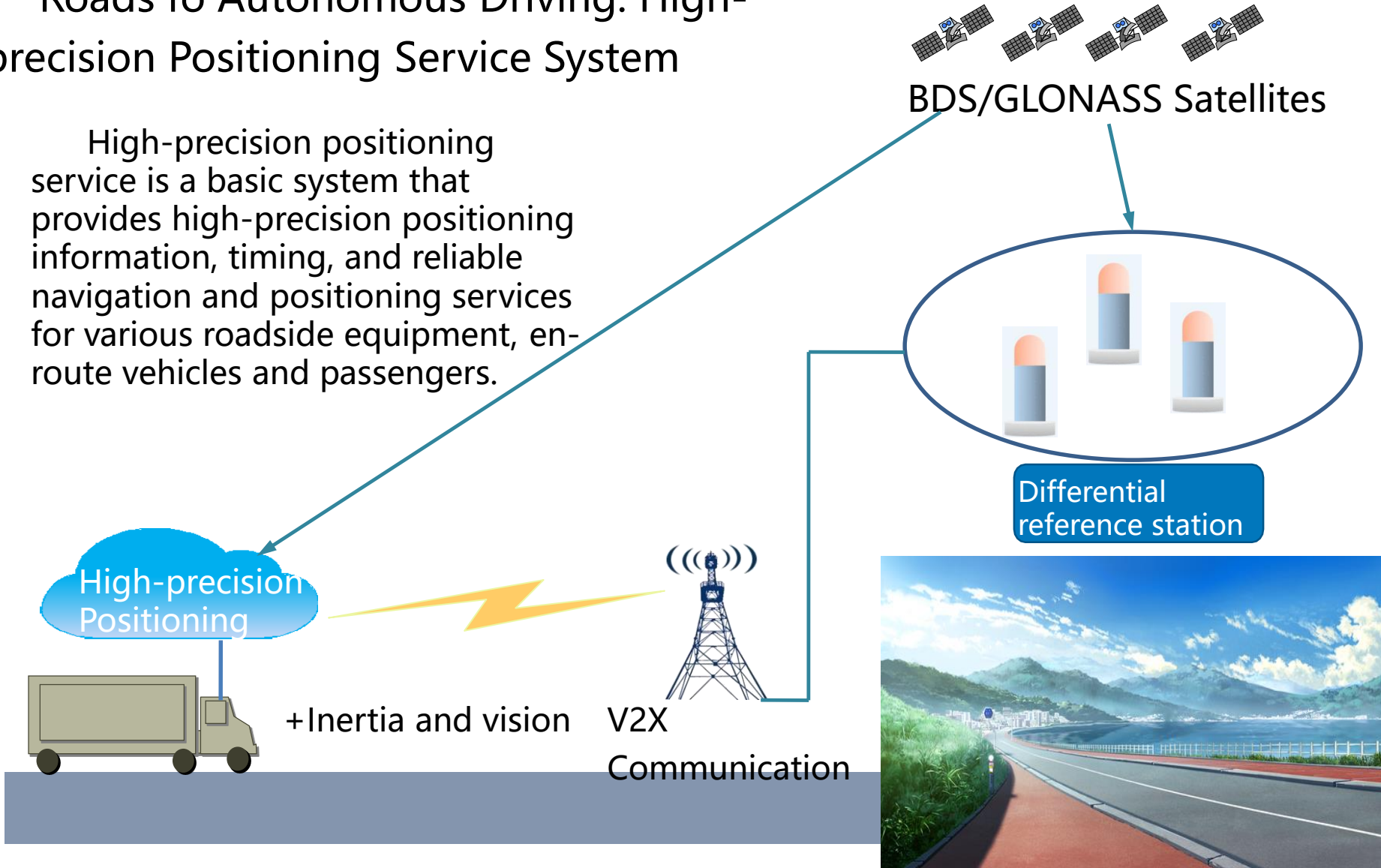
**Differential reference station**



# 3、 Application in Autonomous Driving and Port Management

## Roads fo Autonomous Driving: High-precision Positioning Service System

High-precision positioning service is a basic system that provides high-precision positioning information, timing, and reliable navigation and positioning services for various roadside equipment, en-route vehicles and passengers.



## 4、 Technological Fusion and Business Loading

The above only describes the application of the BDS/GLONASS system at the technical level. It must also be combined with other technologies and with the land-sea transport business.

Technical levels refer to IoT, cloud computing, artificial intelligence, AR, big data analysis, 5G communication and other technologies.



# Thanks for Listening

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