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China Transport Telecommunications & Information Center
中国交通通信信息中心

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高精度卫星导航位置服务网在交通领域的应用

Application of Precise Positioning Service Network based on GNSS in Transportation

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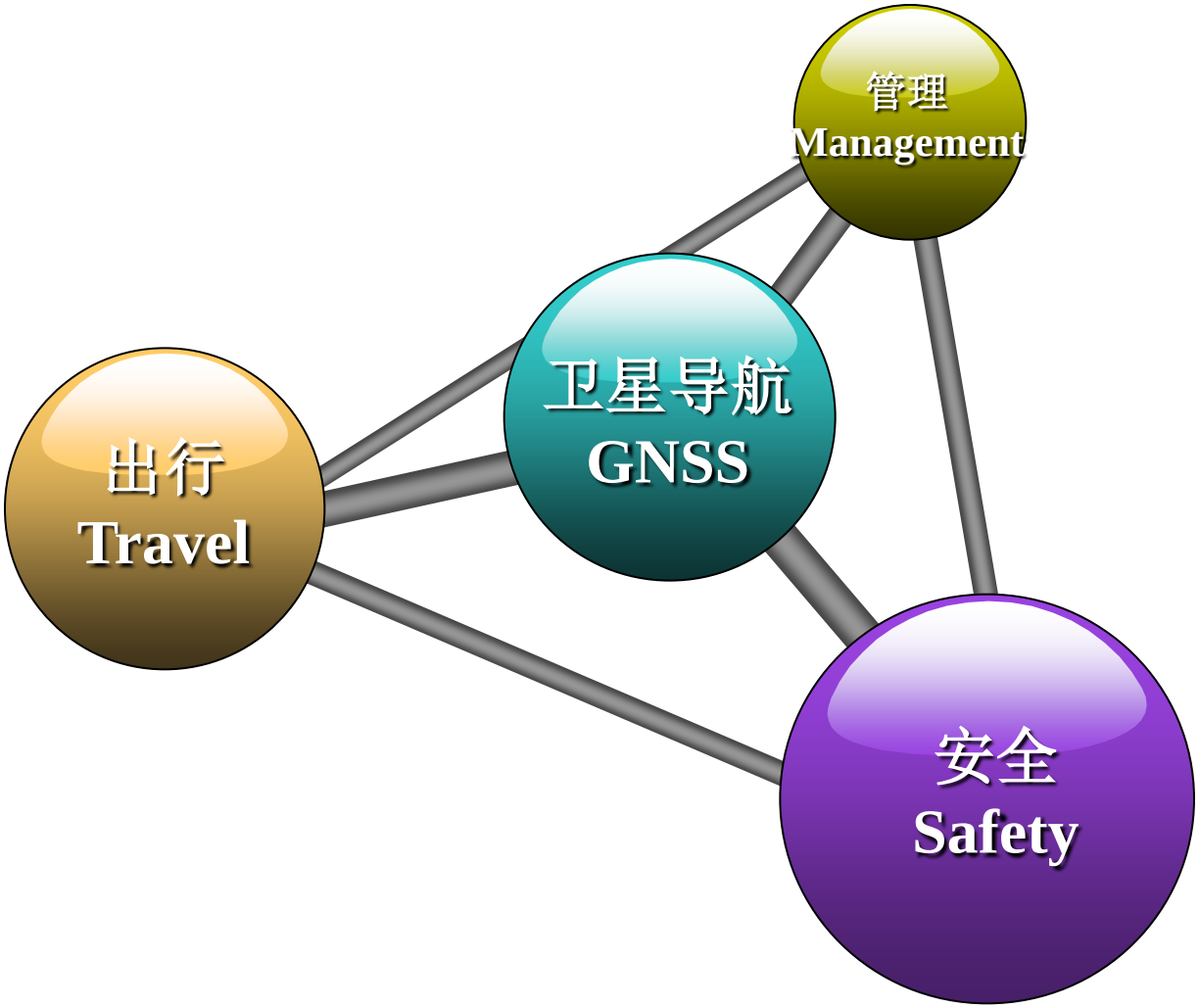
内容提要
Main Content

1 卫星导航系统在交通领域的应用现状
Application Status of GNSS in Transportation

2 卫星导航系统在交通领域发展趋势
Development tendency of GNSS in Transportation

3 高精度位置服务网
Precise Positioning Services Network

卫星导航系统在交通领域的应用现状
Application Status

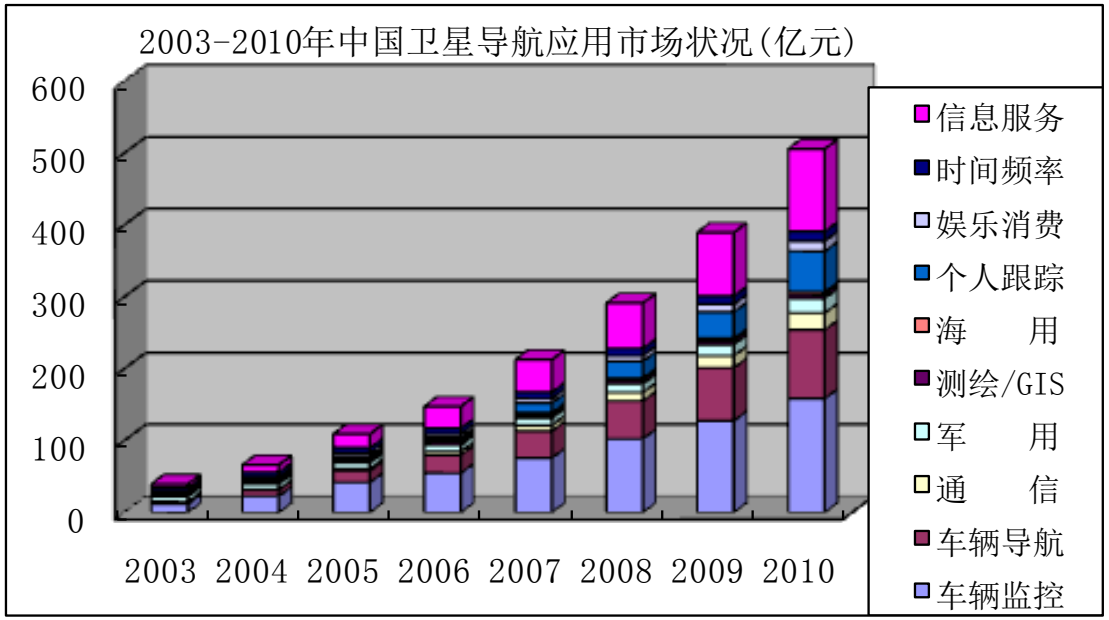


卫星导航系统在交通领域的应用现状
Application Status

- 卫星导航可以感知动的和静的物体。
  GNSS can detect motional or motionless objects.
- 交通运输具有“点多、线长、面广、移动”等特点。
  The features of transportation fit the GNSS well: line and network characteristics, various sports and moving objects, and large scale geographical coverage.
- 现代交通运输业的发展离不开科技的支撑，卫星导航将在交通科技支撑中发挥不可替代的作用。
  Technology progress has always played a crucial role in the development of transportation, the same as GNSS.




卫星导航系统在交通领域的应用现状
Application Status



- 在民用领域，卫星导航已经形成一个庞大的产业，成为重要的空间信息基础设施和第三大信息产业。
  In civilian domains, satellite navigation has been a huge industry that is a crucial space information infrastructure and the third largest information industry.
- 交通运输行业的应用占到卫星导航应用市场的50%左右。
  The application in transportation is about a half of the whole GNSS application market.

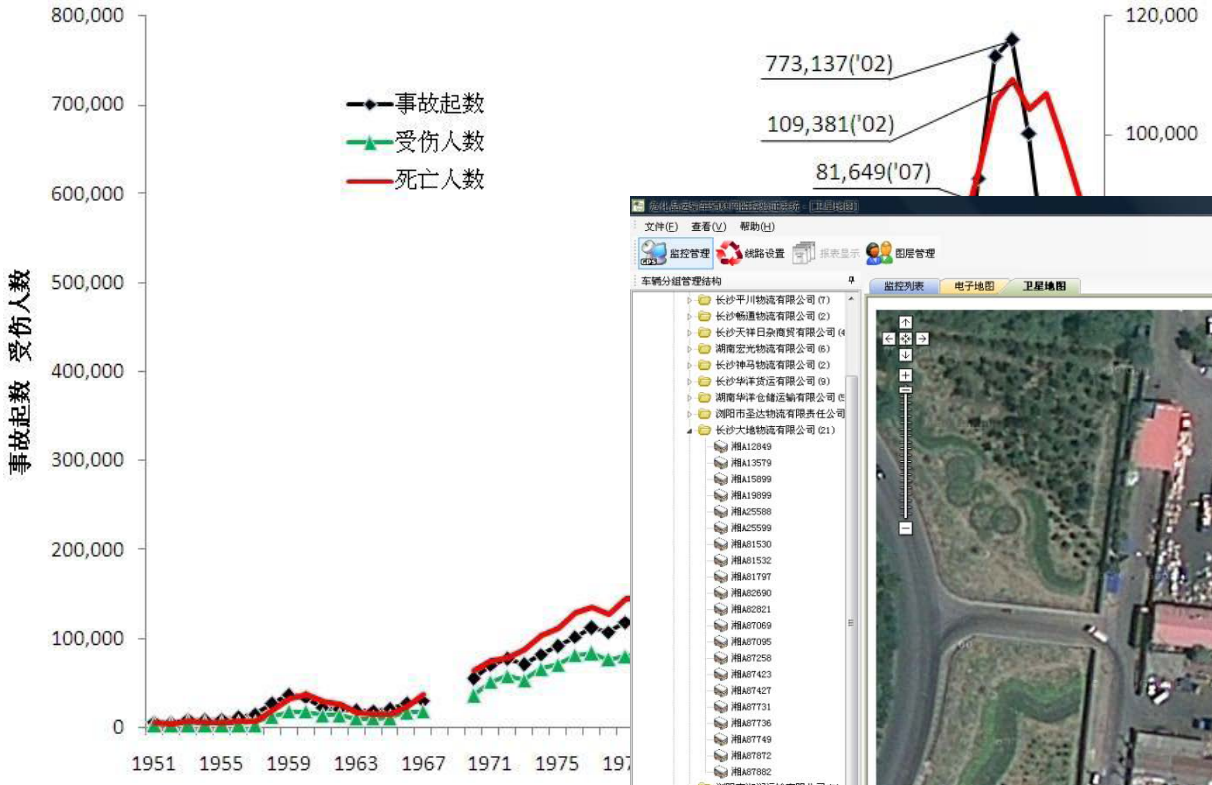
联网联控系统
Integrated Network and Monitoring System

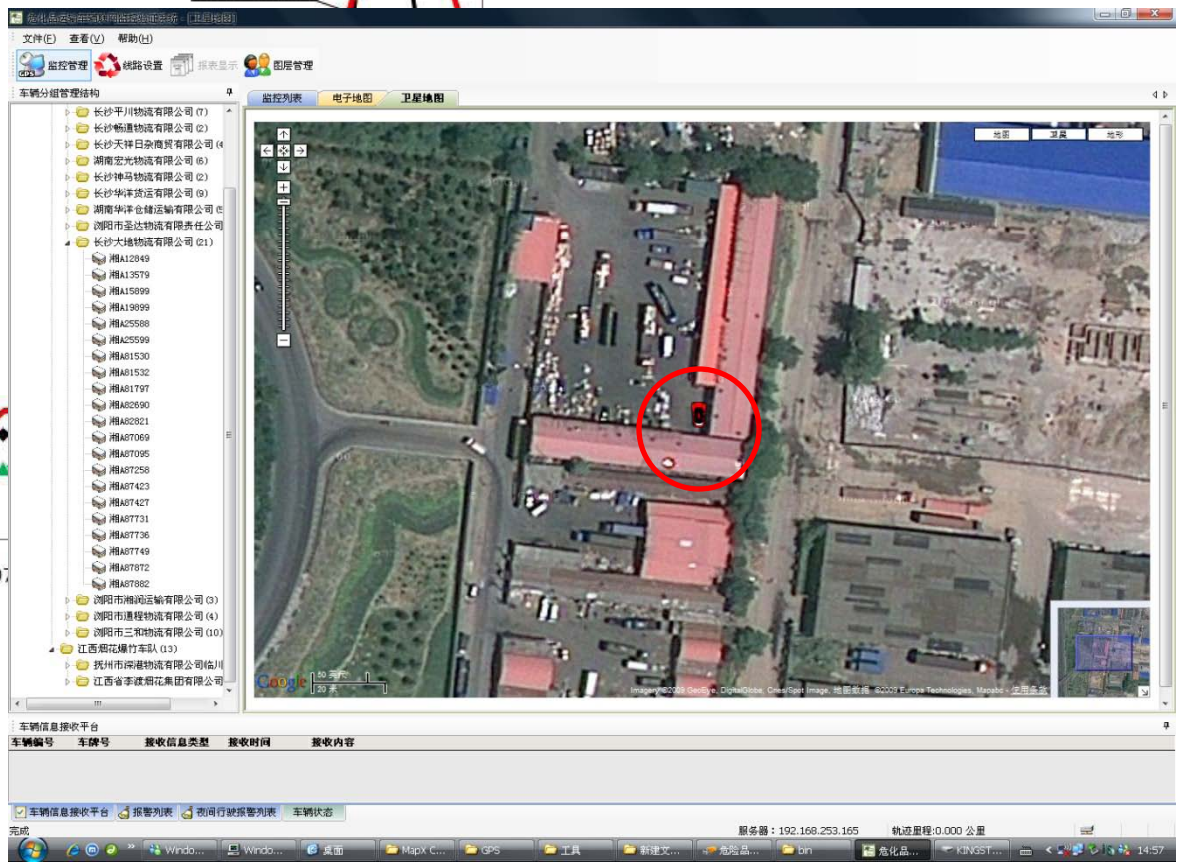
全国重点营运车辆联网联控系统是卫星导航在交通运输行业的重要应用。

One of the important application of GNSS in transportation is the integrated network and monitoring system for key commercial vehicles in China.

联网联控系统
Integrated Network and Monitoring System

联网联控系统
Integrated Network and Monitoring System





联网联控系统
Integrated Network and Monitoring System

2010年5月，上海世博会正式举行。交通运输部决定以上海世博道路运输安全保障工作为契机，规划建设重点营运车辆动态信息公共交换平台，实现营运车辆的跨区域、跨部门的联合监管。

Conducted by the Ministry of Transport, the public real-time information exchange platform of key commercial vehicles was designed and constructed for the Expo 2010 Shanghai, which realizes joint monitoring and management crossing regions and sectors.

联网联控系统
Integrated Network and Monitoring System

广州亚运会期间，全国平台共向广东省平台累计转发跨域车次约42.7万辆次，其中危险品车辆约8.7万辆次，班线客运车约23.1万辆次，旅游包车约6.6万辆次，其他类型车辆约4.3万辆次。

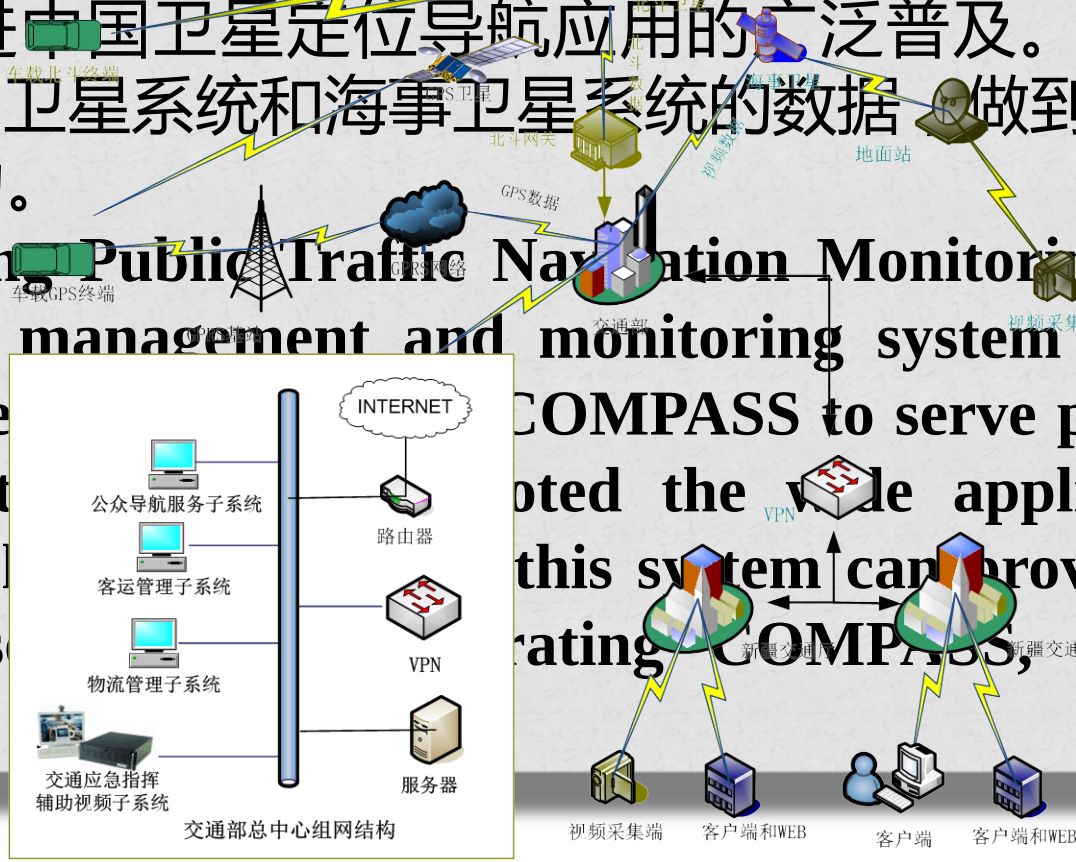
During the Guangzhou Asian Games, platform of country transmitted 427,000 messages of crossing areas to platform of Guangdong Province. Among these messages, there are 87,000 about conveyances of dangerous goods, 231,000 about passenger vehicles, 66,000 about travelling cars, 43,000 about other vehicles.

新疆公众交通导航系统
Xinjiang Public Traffic Navigation Monitoring System

系统框架图
System Structure

新疆公众交通卫星导航监控系统是一套完整的卫星导航监控管理系统，实现了北斗卫星系统为政府和公众服务的目的，促进中国卫星定位导航应用的广泛普及。系统同时兼容了GPS卫星系统和海事卫星系统的数据，做到提供全面服务的能力。

Xinjiang Public Traffic Navigation Monitoring System is a whole management and monitoring system based on GNSS. It re COMPASS to serve public and government oted the wide application of GNSS in C this system can provide many kinds of s rating COMPASS, GPS and Inmarsat.



新疆公众交通导航系统
Xinjiang Public Traffic Navigation Monitoring System

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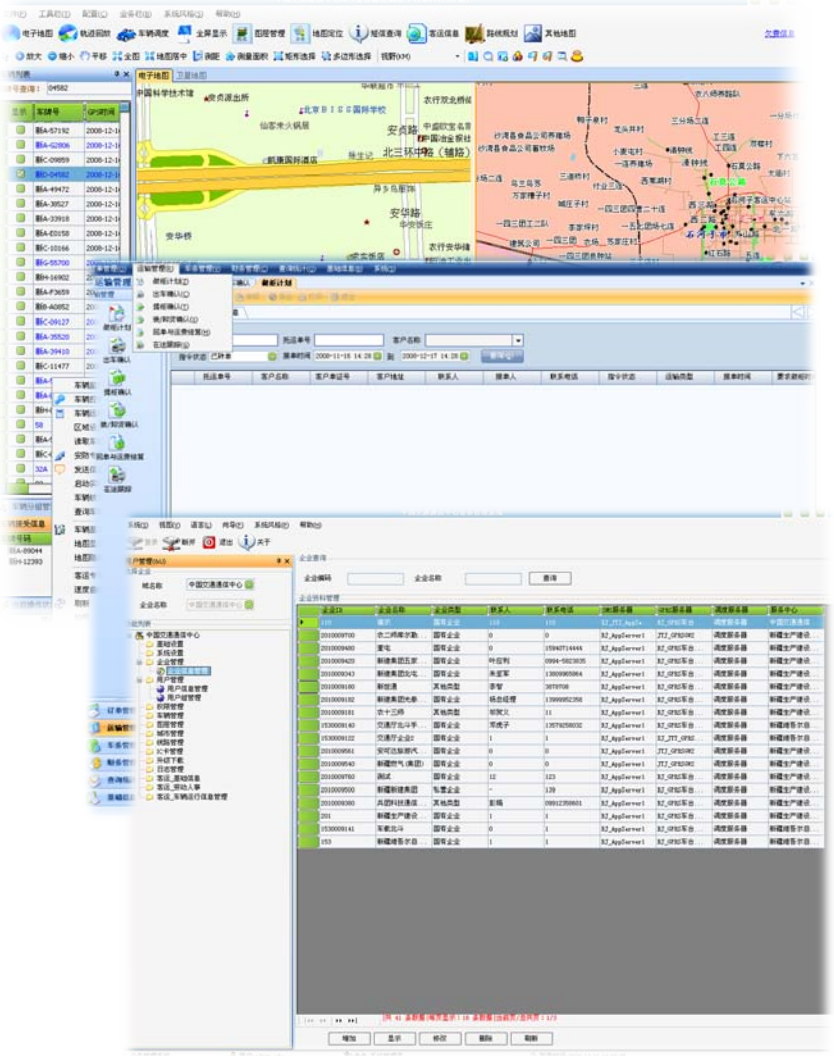
公众导航服务子系统
Public navigation service subsyster

物流管理子系统
Logistic management subsystem

业务管理子系统
Operation management subsystem



新疆公众交通导航系统
Xinjiang Public Traffic Navigation Monitoring System

新疆公众交通导航系统包含：

北斗一代终端：160台　　北斗二代终端：2240台

GPS卫星终端：6850台　　海事卫星手持机：21台

BGAN:4台

用户容量：20万

Xinjiang Public Traffic Navigation Monitoring System include:

COMPASS RDSS terminals: **160**　COMPASS RNSS terminals: **240**

GPS terminals **:** **2650**　Inmarsat terminals: **21**

BGAN: **4**

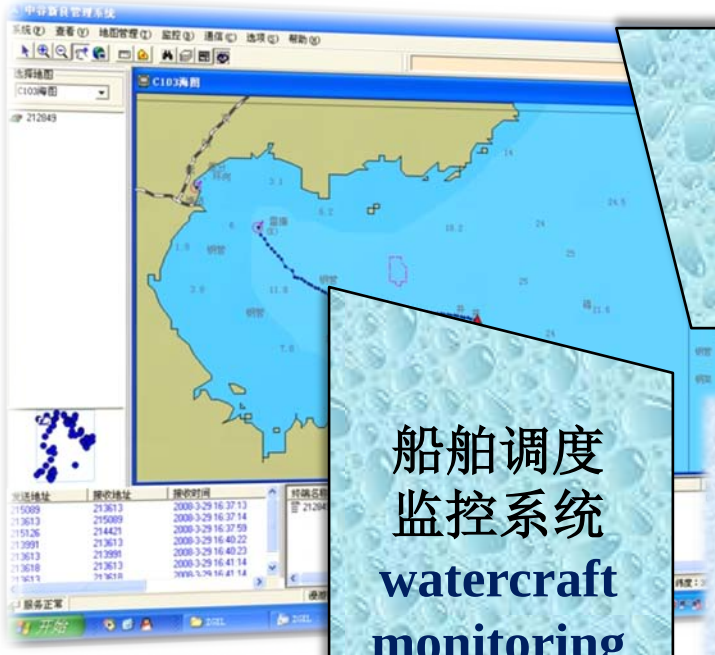
Maximum number of users: 200,000

服务交通主管部门
Serve relevant authorities

服务运输企业
Serve transport undertakings

服务个人用户
Serve personal users

船舶运输
Waterway Transportation



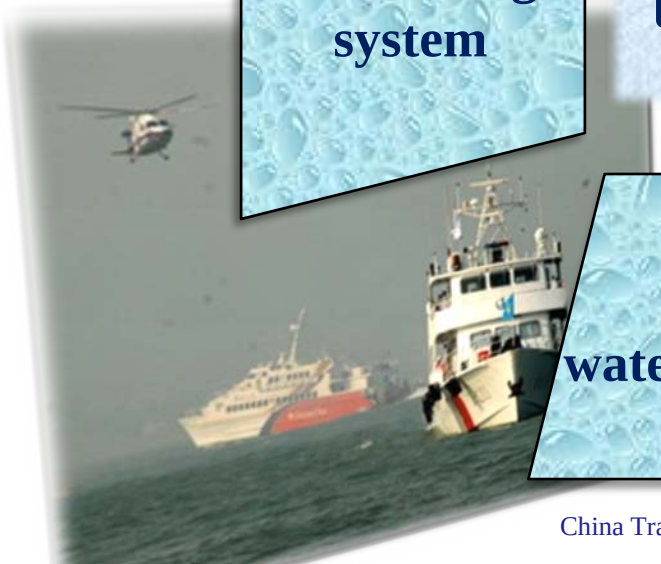
船舶指挥调度系统
watercraft
dispatching system

船舶调度
监控系统
watercraft
monitoring
system

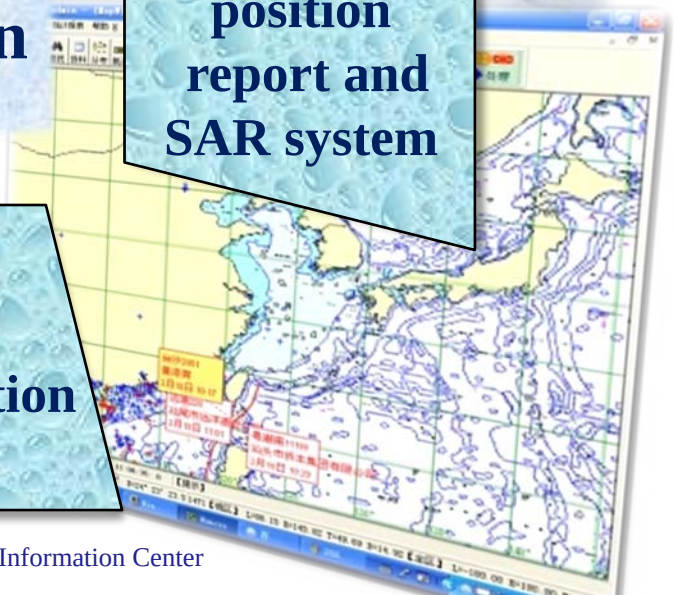
船舶雨啊

船舶运输
Waterway
transportation

渔船船位报
告及遇险救
助系统
watercraft
position
report and
SAR system



内陆水域
交通控制系统
waterway transportation
control system



应用现状——总结
Application Status -Summary

卫星导航系统在交通运输中起到了重要的基础作用
GNSS play an important role in transportation

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Precise Positioning Services Network

发展趋势——新需求
Development Tendency - Future Needs

基于高精度定位的车辆管理系统：

实现对交通违章等精细车辆行为的监控

Vehicle management system based on precise positioning:

realize monitoring traffic violation

基于高完好性、高连续性的车辆连续跟踪系统：

实现对特殊运输车辆的全程监控

Vehicle continuously tracking system based on high integrity and continuity positioning:

realize tracking special vehicle anytime

基于高精度、高可用性绝对定位、相对定位的船舶避撞系统：

实现船舶间、船舶与桥梁间的避撞提醒

Watercraft collision avoidance system based on high accuracy and availability positioning:

realize warning collision of ships or ship and bridge

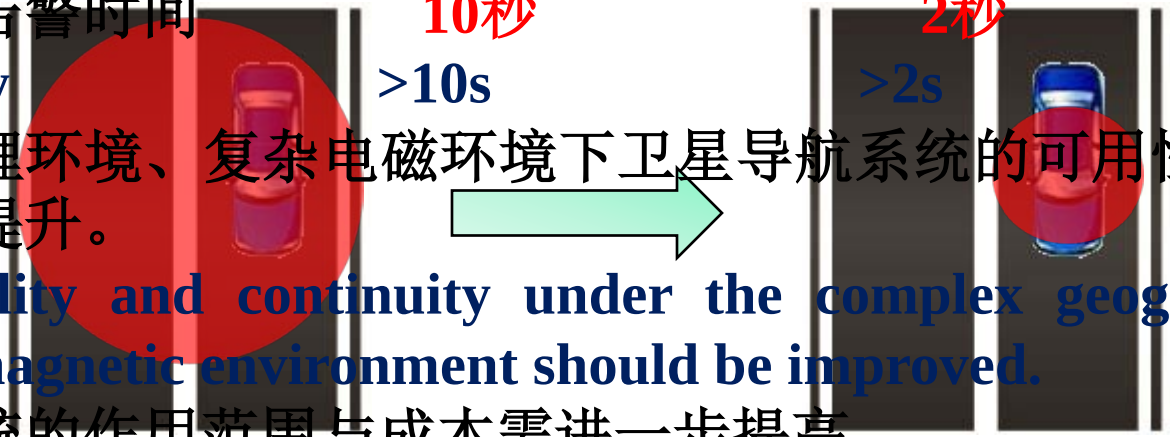
……

发展趋势——制约瓶颈
Development Tendency- Bottleneck

性能指标 Parameter	当前指标 Now	未来需求指标 Future
定位精度	10米级	分米级
Positioning accuracy	10m	10cm
完好性告警时间	10秒	2秒
Integrity	>10s	>2s

复杂地理环境、复杂电磁环境下卫星导航系统的可用性、连续性需进一步提升。

Availability and continuity under the complex geographical and electromagnetic environment should be improved.



现有10米精度定位
Now 10m

新业务需求的分米级精度定位
future

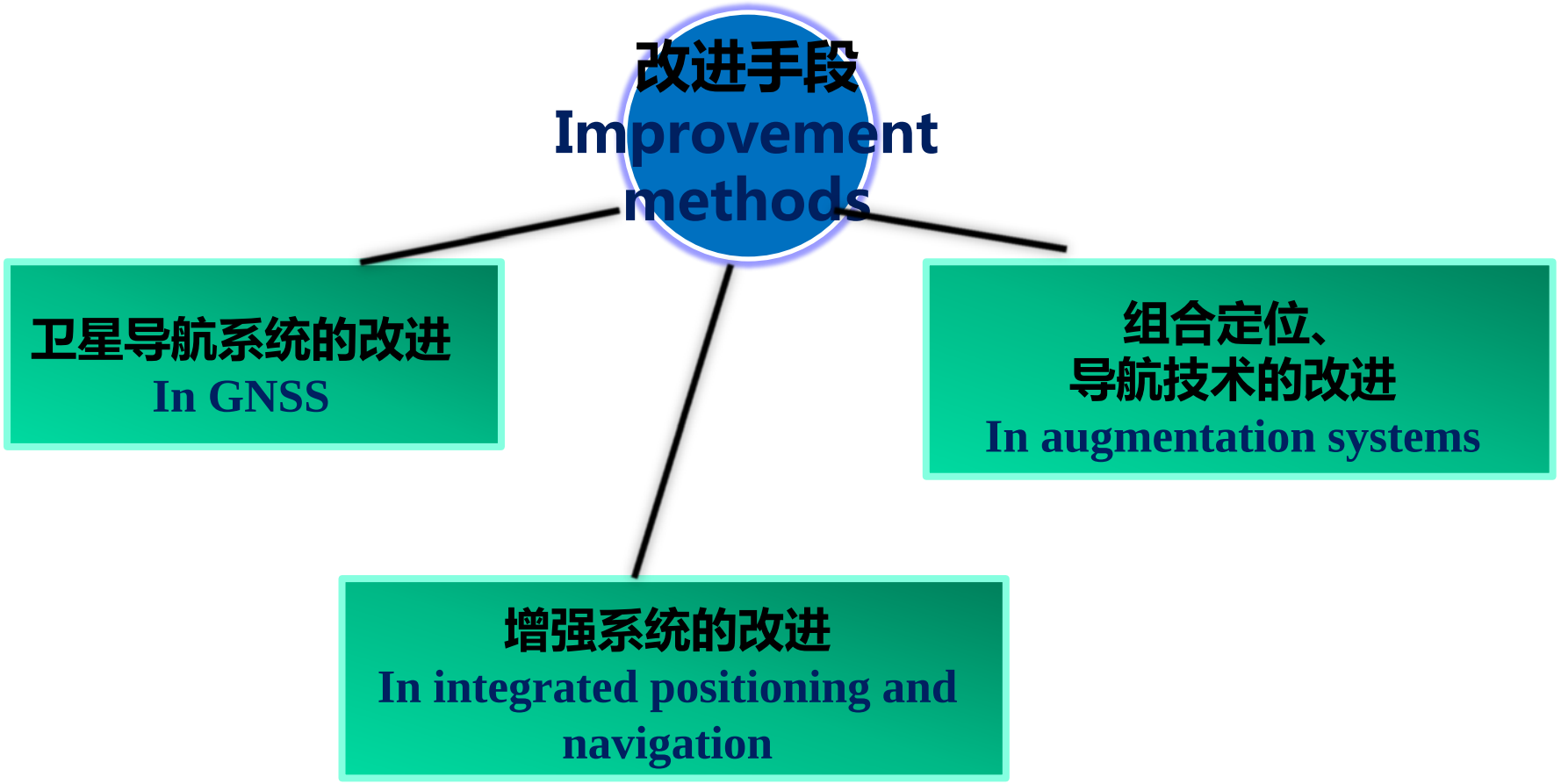
增强系统的作用范围与成本需进一步提高。

The coverage of augmentation system should be larger and the cost be decreased.

基于位置的信息系统脆弱性需要进一步改善。

The vulnerability of information system based on position should be better.

发展趋势——改进手段
Development Tendency- improvement methods



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Precise Positioning Services Network

高精度位置服务网——应用需求
Precise Positioning Services Network - application needs

公路车辆高精度定位

Precise positioning of Road vehicle

交通违章行为监控

Traffic violation monitoring

特殊运输车辆全程监控

Special traffic vehicle overall monitoring

高精度位置服务网——应用需求
Precise Positioning Services Network - application needs

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水上高精度定位
Precise positioning on water

疏浚工程管理

-Dredging work management

船舶安全管理

-Watercraft safety management

船舶精密引航

-Watercraft precise pilotage

港口高精度调度监控

-Precise port dispatch operation monitoring

高精度位置服务网——建设意义
Precise Positioning Services Network - significance

面向：四A

Anybody, Anything, Anytime, Anywhere的导航与位置服务需求

Target for : 4A

Navigation and positioning service for Anybody, Anything, Anytime, Anywhere

集成应用：五网

导航定位网、移动通信网、数字广播网、互联网、传感网等基础设施

Integrate 5 network

Navigation network, mobile communication network, Digital broadcasting network, Internet, sensor network

提供：两类服务

实时高精度定位、导航、时间服务

深层位置信息服务

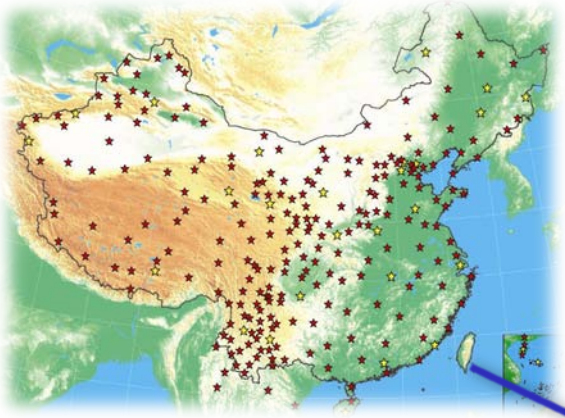
Provide：two category services

Real-time precise positioning, navigation, time service

Extended information service based on positioning

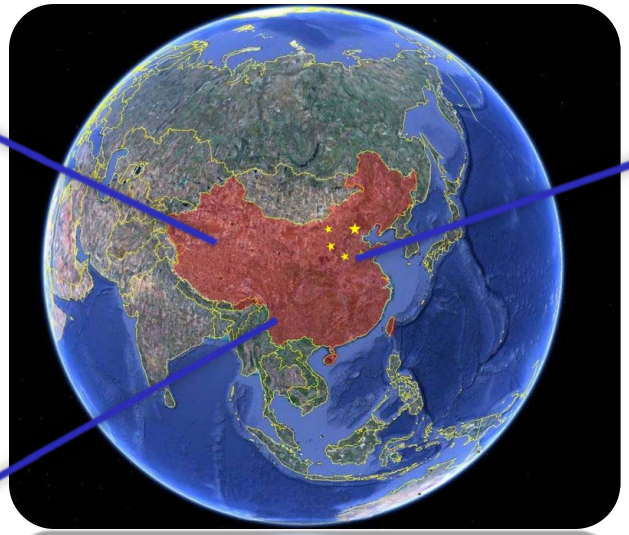
高精度位置服务网——资源整合

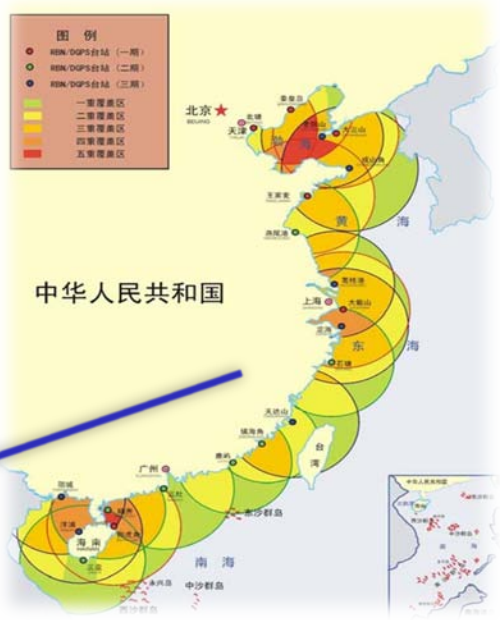
Precise Positioning Services Network - resource integration



全国大地构造环境观测网络

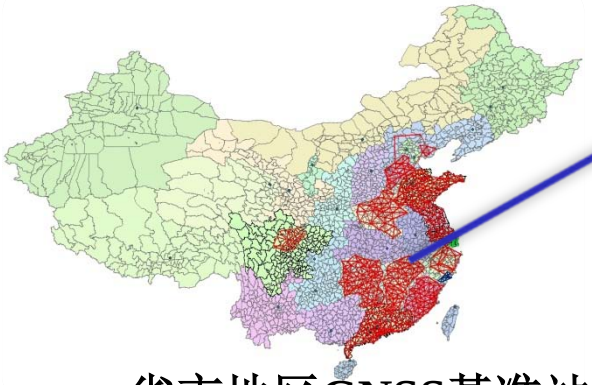
Crustal Movement Observation Network of China(CMONOC)





沿海RBN-DGPS基准站

RBN-DGPS base stations

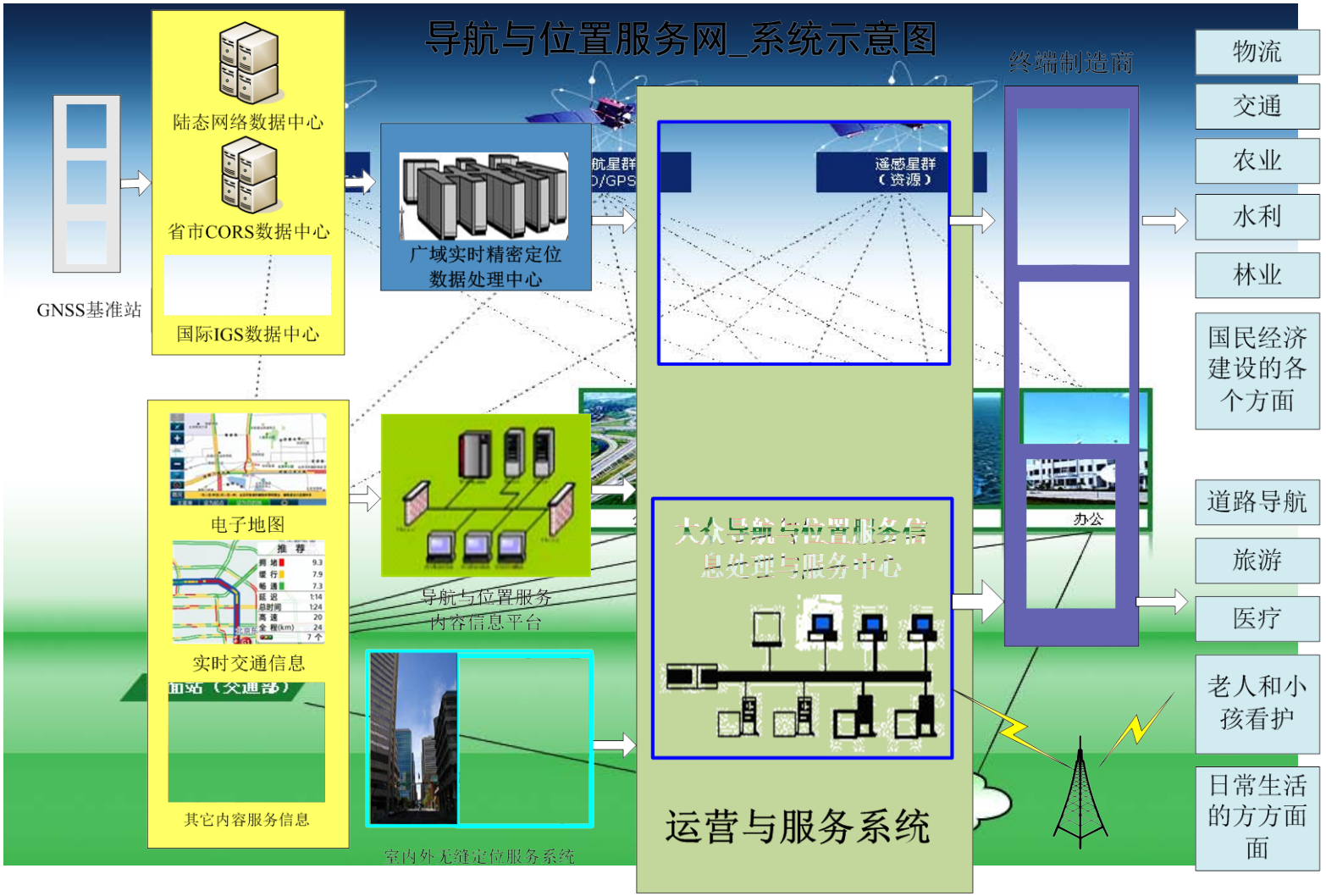


省市地区GNSS基准站

GNSS base stations at provinces and cities

高精度位置服务网——系统架构

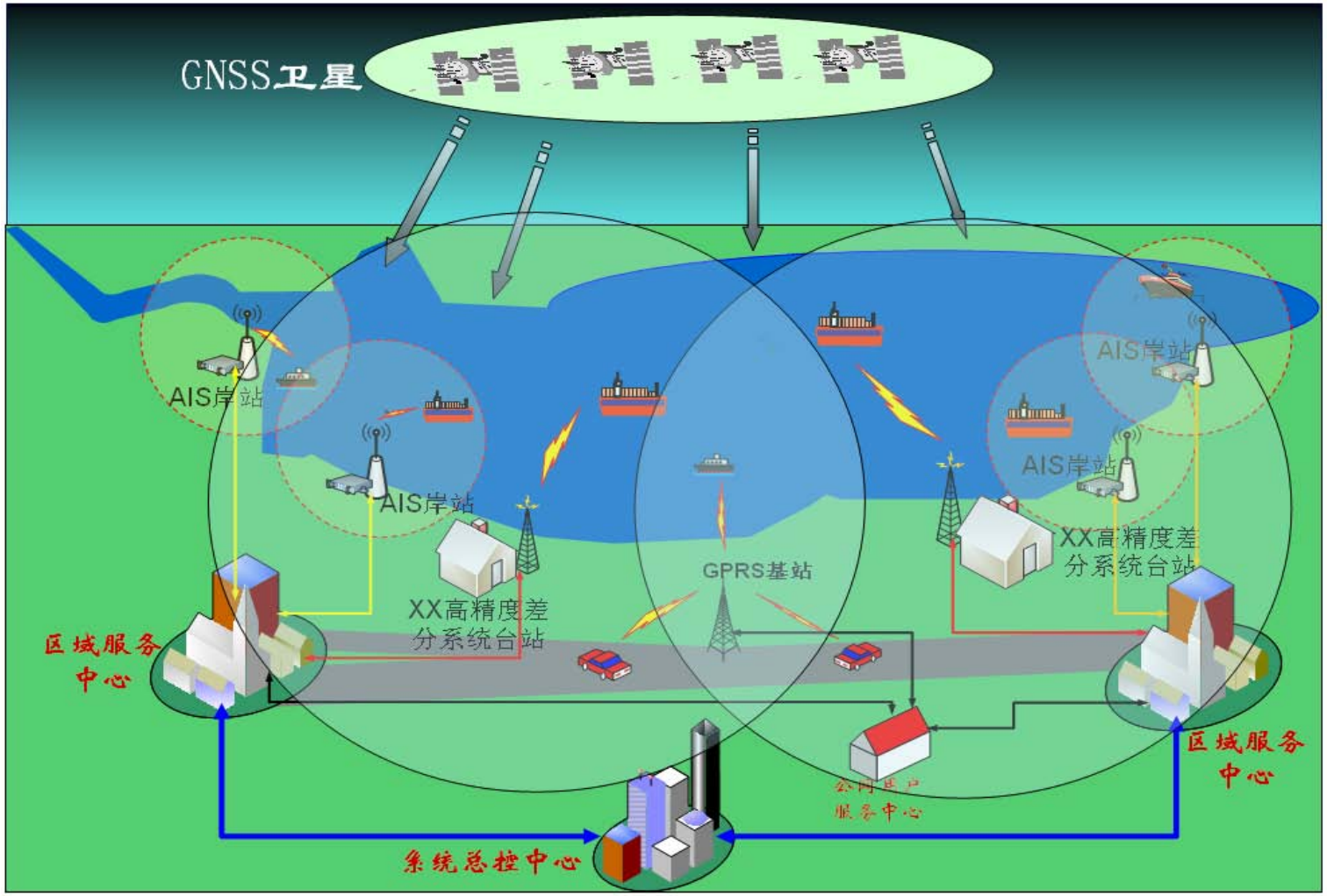
Precise Positioning Services Network - system framework



高精度位置服务网——IAIS链路

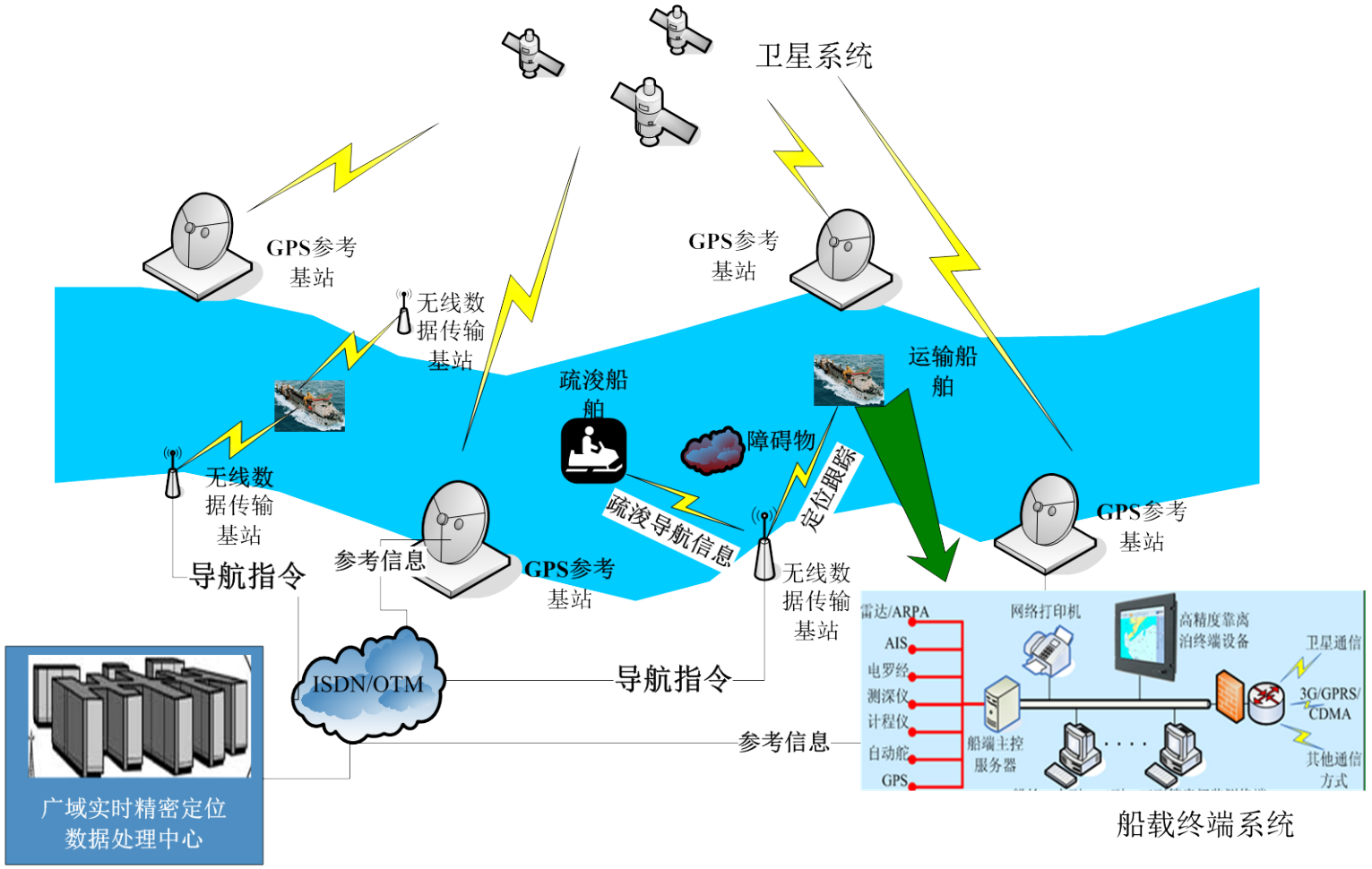
Precise Positioning Services Network - IAIS link

IAIS信息播发链路



高精度位置服务网——RBN链路

Precise Positioning Services Network – RBN link



高精度位置服务网——关键技术
Precise Positioning Services Network – key technology

广域分米级实时精密定位技术
Wide area real-time precise positioning technology

卫星导航系统区域脆弱性评估
Regional vulnerability estimate of GNSS

区域脆弱性改善技术
Overcome regional vulnerability of GNSS

谢 谢 !

Thanks for your attention !