Safety of Global Navigation Satellite System (GNSS) Applications and Joint Countermeasures

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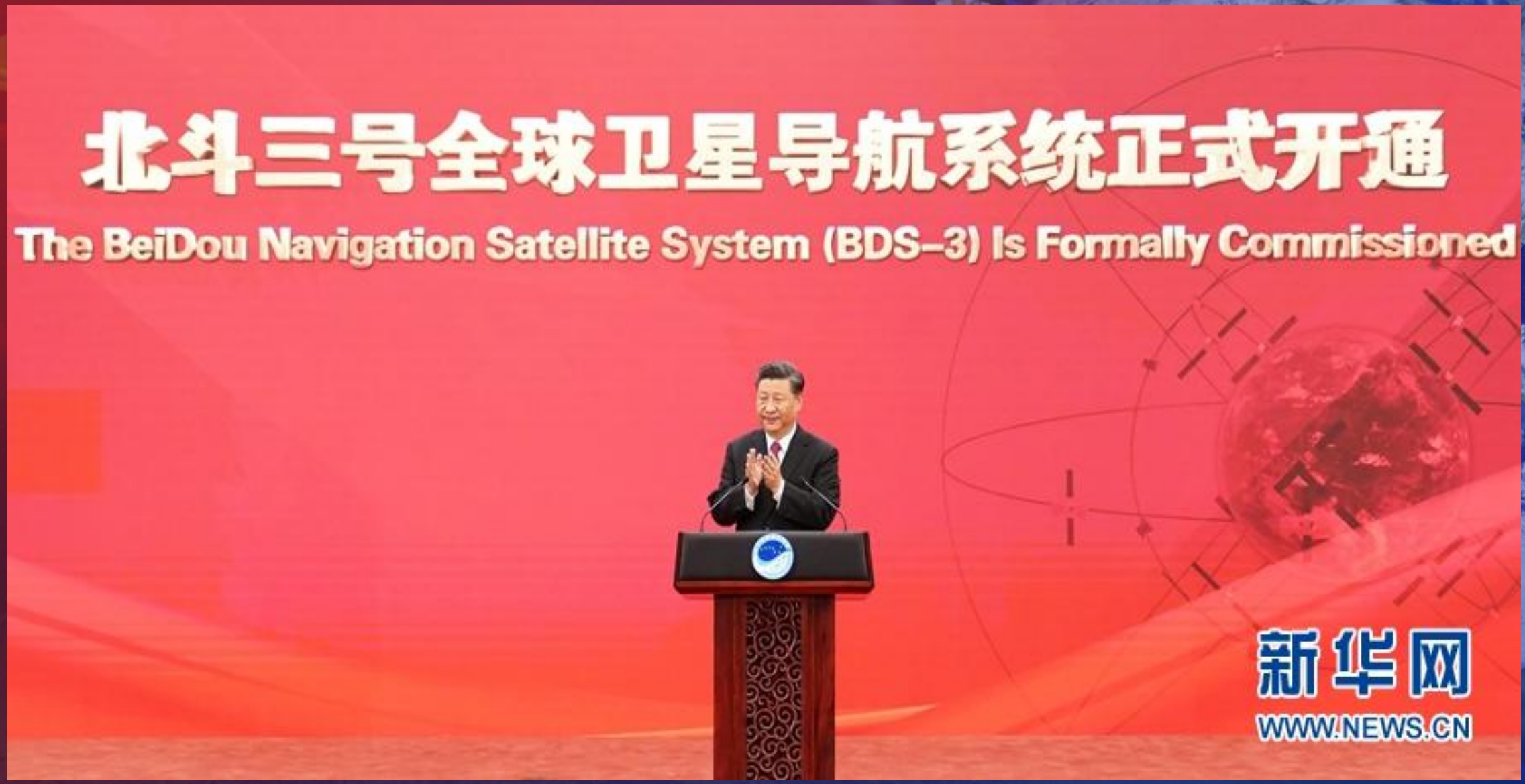
August 26th, 2021

CONTENT


北斗三号全球卫星导航系统正式开通
The BeiDou Navigation Satellite System (BDS-3) Is Formally Commissioned
新华网
WWW.NEWS.CN

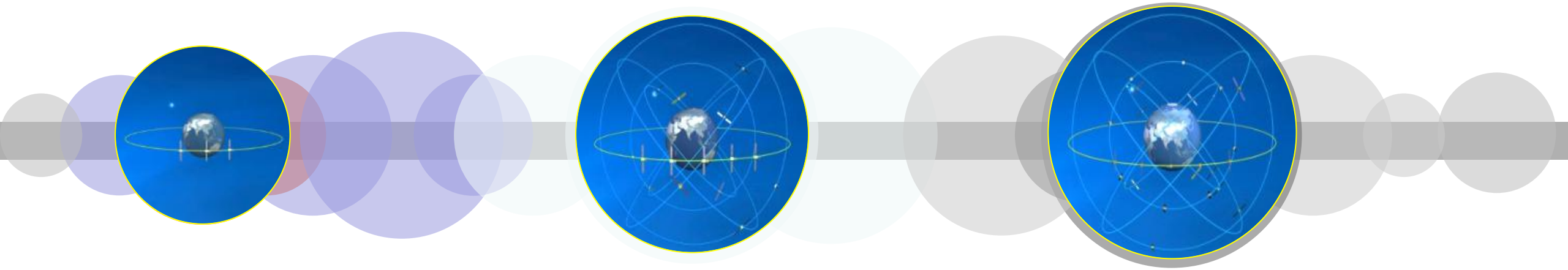
1 Development of BDS_ Operation of BDS

- **Development Roadmap:** BeiDou Navigation Satellite System (BDS) has been developing following a "three-step" roadmap, from active to passive services, quickly possessed regional service capabilities, and then gradually extended to global services with unique features.

Step 1: 1994～2000, Regional active network service capability

Step 2: 2004～2012, Regional passive network service capability

Step 3: 2013～2020, Global passive network service capability

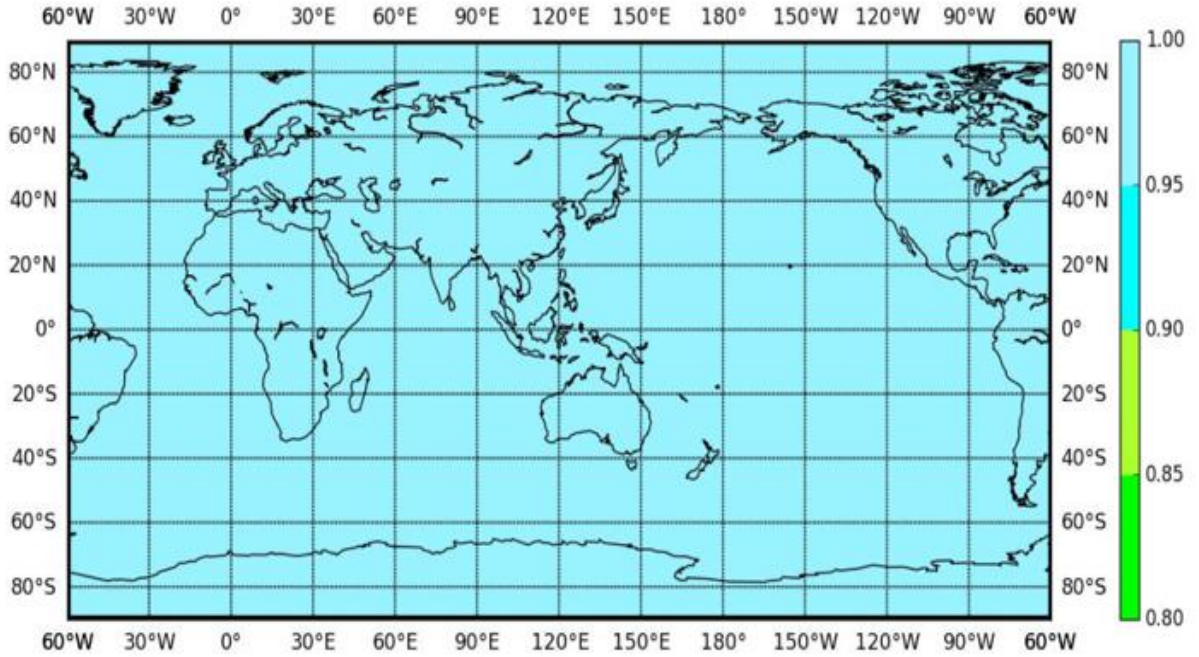


1 Development of BDS_ Operation of BDS

■ Service capability: Positioning, Navigation, Timing (PNT)

Performance characteristics		Performance specification
Service availability (99.99%)	Global Positioning accuracy (95%)	horizontal≤7 m vertical≤9 m
	Global Timing accuracy (95%)	≤20 ns
	Global Velocity measurement accuracy (95%)	≤0.2 m/s

BDS Availability (5° Elevation Mask, PDOP≤6)



1 Development of BDS_ Applications of BDS

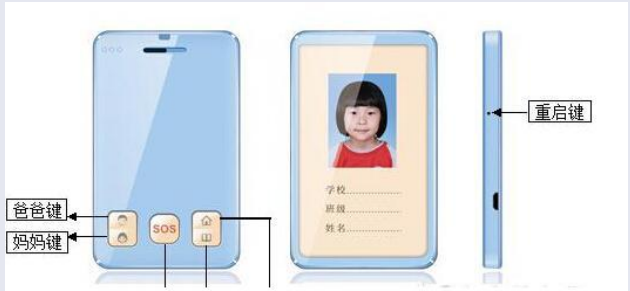
- **Industrial Chain:** A complete industrial chain integrating chips, modules, boards, terminals, operations and services has been built.

1 Development of BDS_ Applications of BDS

- **Application Industries:** BDS has been widely used in the fields of transportation, public safety, disaster relief, agriculture, forestry, animal husbandry, fishery and urban governance, serving national core infrastructure construction and generating significant economic and social value.

1 Development of BDS_ Applications of BDS

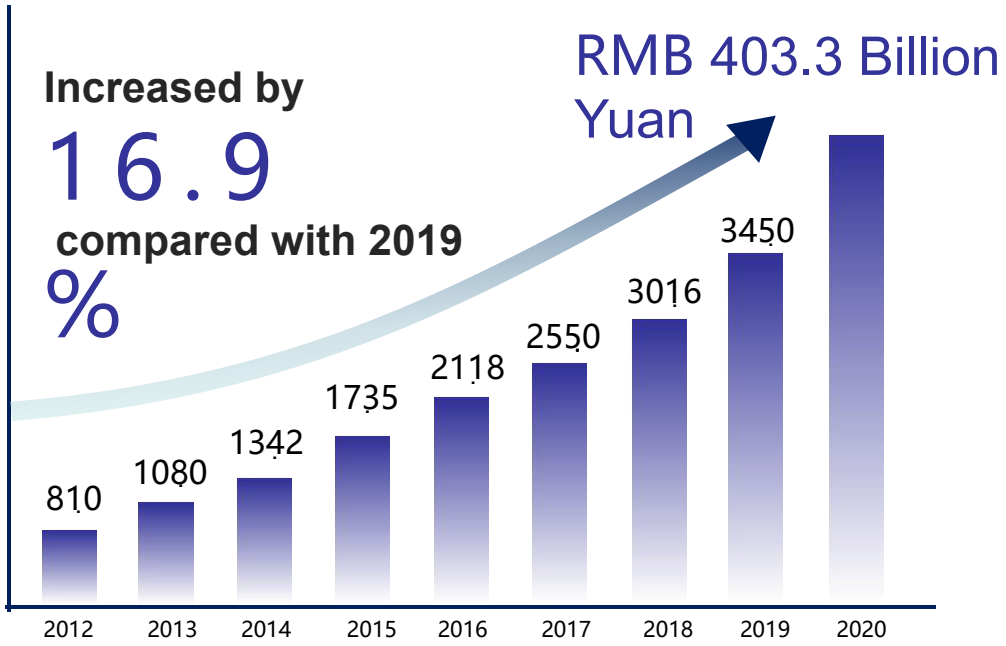
- **Mass Market:** BDS has entered the fields of mass market, shared economy and people's livelihood. 79% smart phones sold in China in the 1st quarter of 2021 supported BDS-based positioning function.



1 Development of BDS_ Applications of BDS

■ Industrial Output Value:

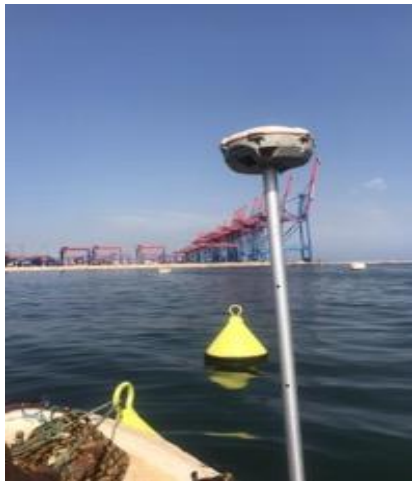
China's satellite navigation and location-based service industry



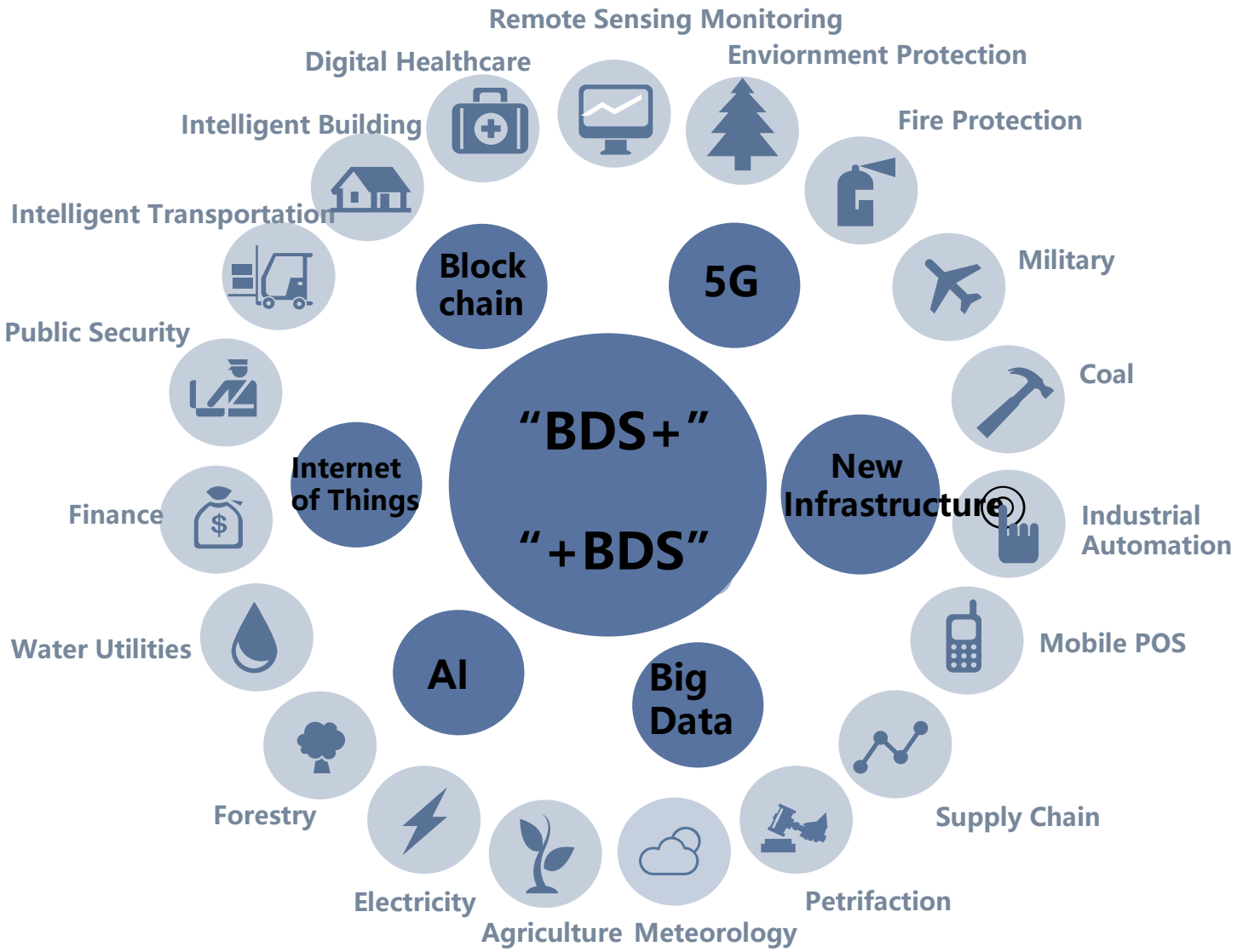
1 Development of BDS_ Applications of BDS

International applications

- Confirmation of land right
- Precision agriculture
- Digital construction
- Vehicle supervision
- Smart port management



1 Development of BDS_ Applications of BDS



New Applications

- New Fields
- New Business Models
- New Technologies

2 Safety of GNSS Applications

GNSS is a vivid practice of peaceful use of outer space to serve all humankind

GPS
(United States)

GLONASS
(Russian Federation)

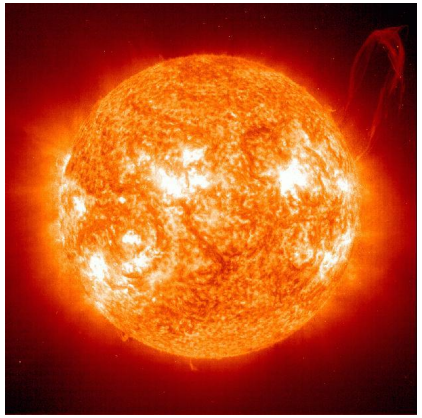
BDS
(China)

GALILEO
(European Union)

2 Safety of GNSS Applications

Risks that threaten the safety of GNSS applications

- space debris
- crowded space environment
- natural and human interference
- abuse of positioning and navigation data



It is a common challenge faced by all countries using GNSS to prevent risks and realize safe applications of GNSS.

3 China's Institutional Measures to Ensure Safe Applications of GNSS

(1) Improving the legal system

(2) Enhancing management transparency

(3) Ratification by international standards

(4) Strengthening law enforcement

3 China's Institutional Measures to Ensure Safe Applications of GNSS

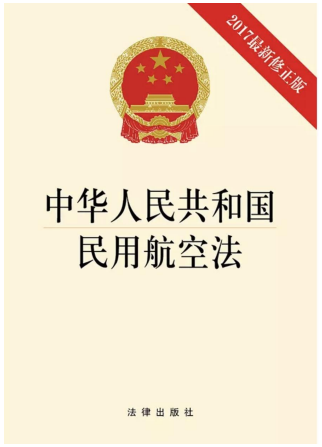
(1) Improving the legal system

laws and regulations

Personal Information Protection Law

Data Security Law

Cyber Security Law



Civil Aviation Law

Radio Regulation

Criminal Law

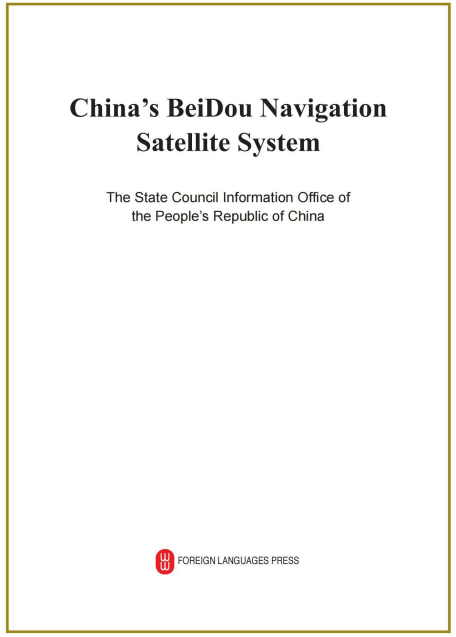
special regulation

中华人民共和国
卫星导航条例
(制定中)

Satellite Navigation Regulation

3 China's Institutional Measures to Ensure Safe Applications of GNSS

(2) Enhancing management transparency



White Paper on China' s BeiDou Navigation Satellite System

- Explaining Chinese government's policy stance on protecting the use of satellite navigation spectrum and resolutely resisting harmful interference

Report on the Rule of Law of the BeiDou Navigation Satellite System

- Summarizing the experience and effects of the rule of law of BDS, and explaining Chinese government's practices in protecting safe applications of GNSS

3 China's Institutional Measures to Ensure Safe Applications of GNSS

(3) Ratification by international standards

- Promoting ratification by international organizations to ensure that BDS serves global applications in accordance with international rules.

3GPP A GLOBAL INITIATIVE

IEC International Electrotechnical Commission

COSPAS SARSAT

IMO

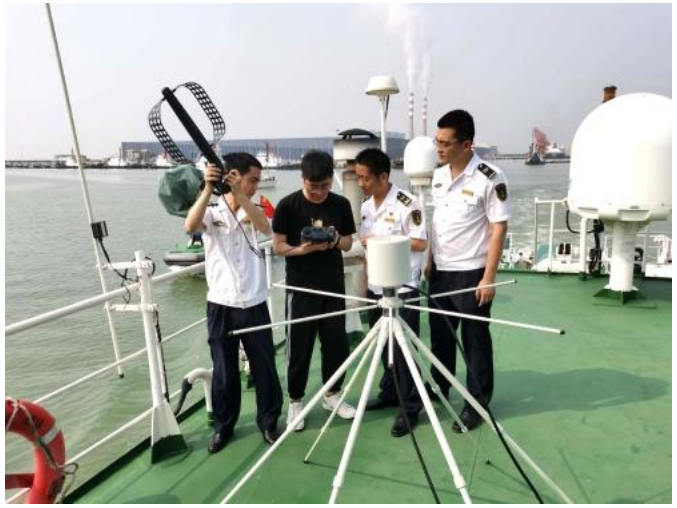
ICAO · OACI · ИКАО 国际民航组织

RTCM RTCM

3 China's Institutional Measures to Ensure Safe Applications of GNSS

(4) Strengthening law enforcement

- Prohibiting the production, sale, or use of satellite navigation interfering equipment
- Dealing with any malicious interference behaviors that affect the operation and service of GNSS



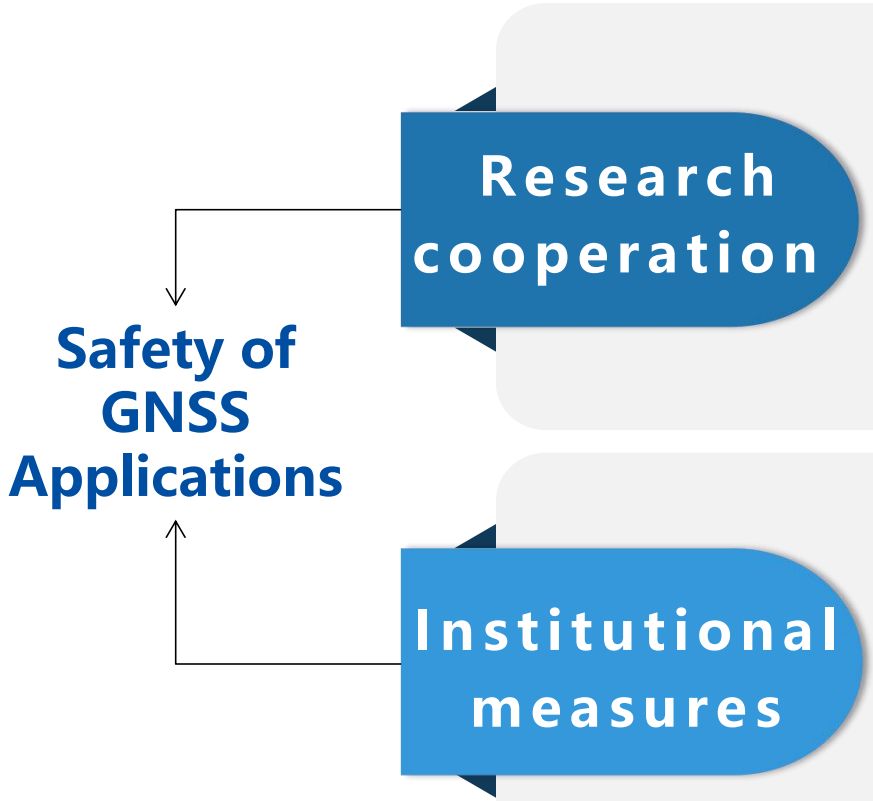
4 Joint Countermeasures

- ***Outer Space Treaty* provides basic principles for promoting safe and reliable provision of services for mankind by space systems, including GNSS.**

  - **Article I** The exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.
  - **Article IX** In the exploration and use of outer space, including the Moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance and shall conduct all their activities in outer space, including the Moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty.

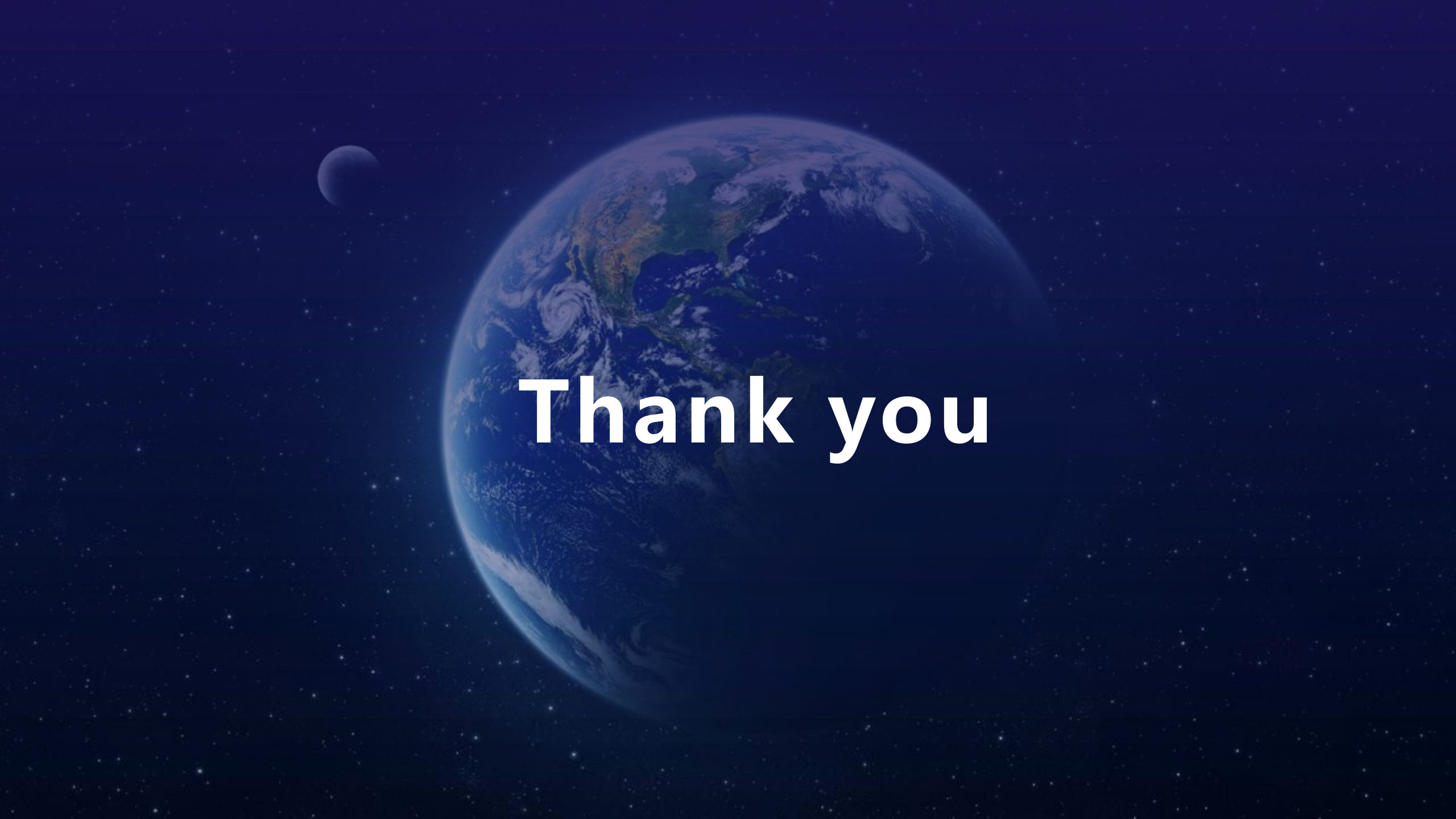
4 Joint Countermeasures

Pay attention to the safety issues of GNSS applications



- **Definition of safety of GNSS applications**
- **Safety risks** of GNSS applications: types, causes, identification, standards, adverse consequences, solutions

- **Goal:** protecting the safety of GNSS applications
- **Countermeasures:** propelling the establishment of the regulations and laws on safe application of GNSS in varied countries.


Thank you