



**APSCO**  
ASIA-PACIFIC SPACE COOPERATION ORGANIZATION

# Space Cooperation is a Benefit Multiplier

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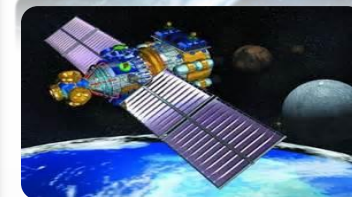
1. Space is the driver of Socioeconomic Sustainable Development
2. Space Cooperation is a Benefit Multiplier
3. How APSCO benefits its Member States
4. Recommendation



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## *Benefit from Space*

- About sixty years of human activity in space have produced enormous societal benefits that improve the quality of life on Earth
- The first satellites designed to Study the space environment and test initial capabilities in Earth orbit contributed critical knowledge and capabilities for Human Civilization





➤ Directly: People don't need to care the existence of space facilities, but always can enjoy the benefits from space

- TV & broadcast
- Communication
- Navigation and positioning
- Education
- Weather forecasting
- Disaster management
- Environmental protection
- Agriculture
- Global search and rescue
- Natural resource management, etc.





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## *Driving Force from Space*

➤ More: Space technology is the most powerful driving force to development of national industries, application technologies and all fields of socioeconomic

- Material
- Power generation & Energy storage
- Recycling & waste management
- Advanced robotics
- Health & medicine
- Transportation
- Engineering
- Climate change and research
- Dynamic Internet and Internet of things
- Computing & software, etc.

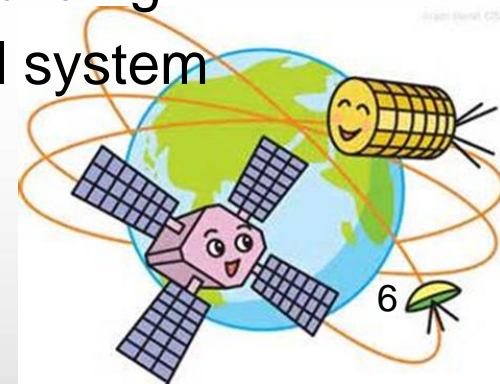




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## ***Become a Space Nation***

- More and more countries are eager to become space nations. Because the space is the most important factor to promote their social economic development, especially the developing countries.
- Not every country can become a space system country, but all of the nations can benefit from space
- As a Space Nation, two capacities are necessary
  - To use space: Benefit people by Space Application-Share
  - To own space: Higher National Capability building-  
Master space technology, Perfect technical system  
and Systematic Industrial bases





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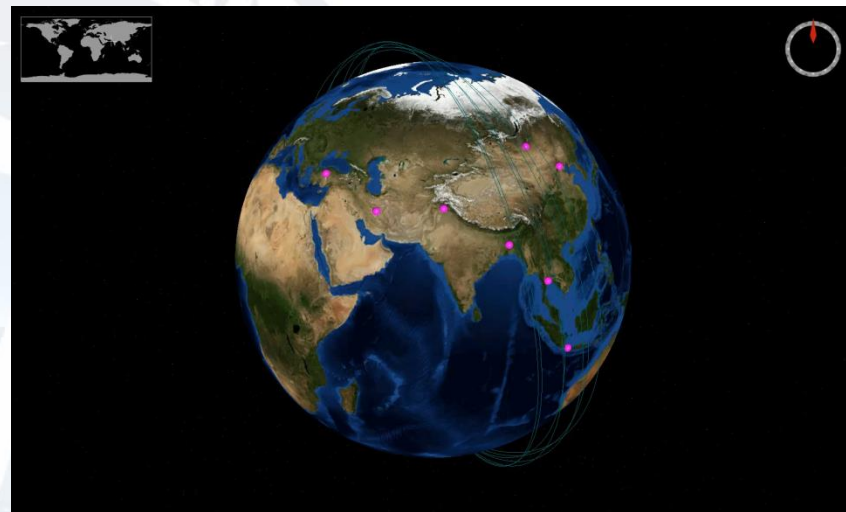
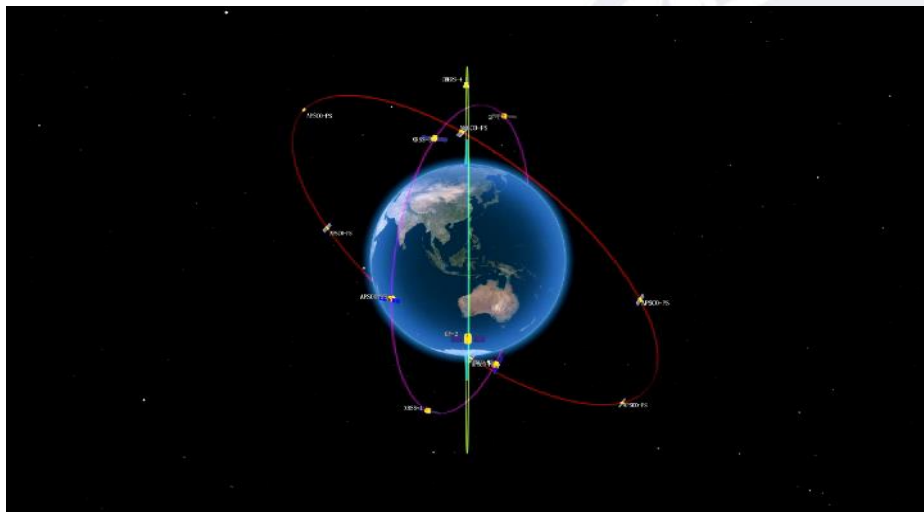


- The space technology involves
  - ◆ High technology
  - ◆ Strong industry foundation
  - ◆ High risk
  - ◆ Huge investment
  - ◆ Require long term of period for return
  
- It is difficult achievable for most of nations, especially developing countries, to reach the goals individually.





- Most of the space infrastructures running on their orbits around the earth and covered every corner of the globe



- These resources are easy to be shared by all countries located in different region of the world (2% life time+)



- Pooling up of the finance, technical know how and human resources of participating countries
- Maximize sharing the space infrastructures
- Networking all ground stations
  - ◆ The cost of space activities will be significantly reduced
  - ◆ The Interests of space activities will be obviously multiplied



- Space Nation involved is very necessary or else Nothing to be shared but only dreams.



➤ Regional cooperation initiatives are the best means for bridging the technology gap among nations

➤ Earth has been wrapped up by different vehicles

➤ Space nations help to strengthened and develop space accessibility capacities for emerging space nations will

—not only enhance the level of space technology and its application

—but also improve the technical reliability and safety of the orbital environment

➤ The first UN Outer Space Treaty in 1967

Encourages International Cooperation



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*Who*

- 1. APSCO is the second space multilateral inter-governmental organization after ESA**
  - with full international juridical personality
  - registered in the United Nations
  - all its Members are developing countries
- 2. UNOOSA Observer since 2009**
- 3. Permanent Observer of UN-COPUOS**
- 4. Observer of GEO and ICG**
- 5. Collaboration with other organization: UN-ESCAP, UN-SPIDER, UN-RCSSTEAP, ISSI-BJ and ESA**



## **Within Asia Pacific region**

- Large amount of population
- Vast geographical area
- Largest commercial satellite quantity demanded
- Various natural disasters are cross boundaries
- Lack of budget, technical capabilities and also human resources in most of the Asia Pacific Countries
- China willing to sharing their experience and resources

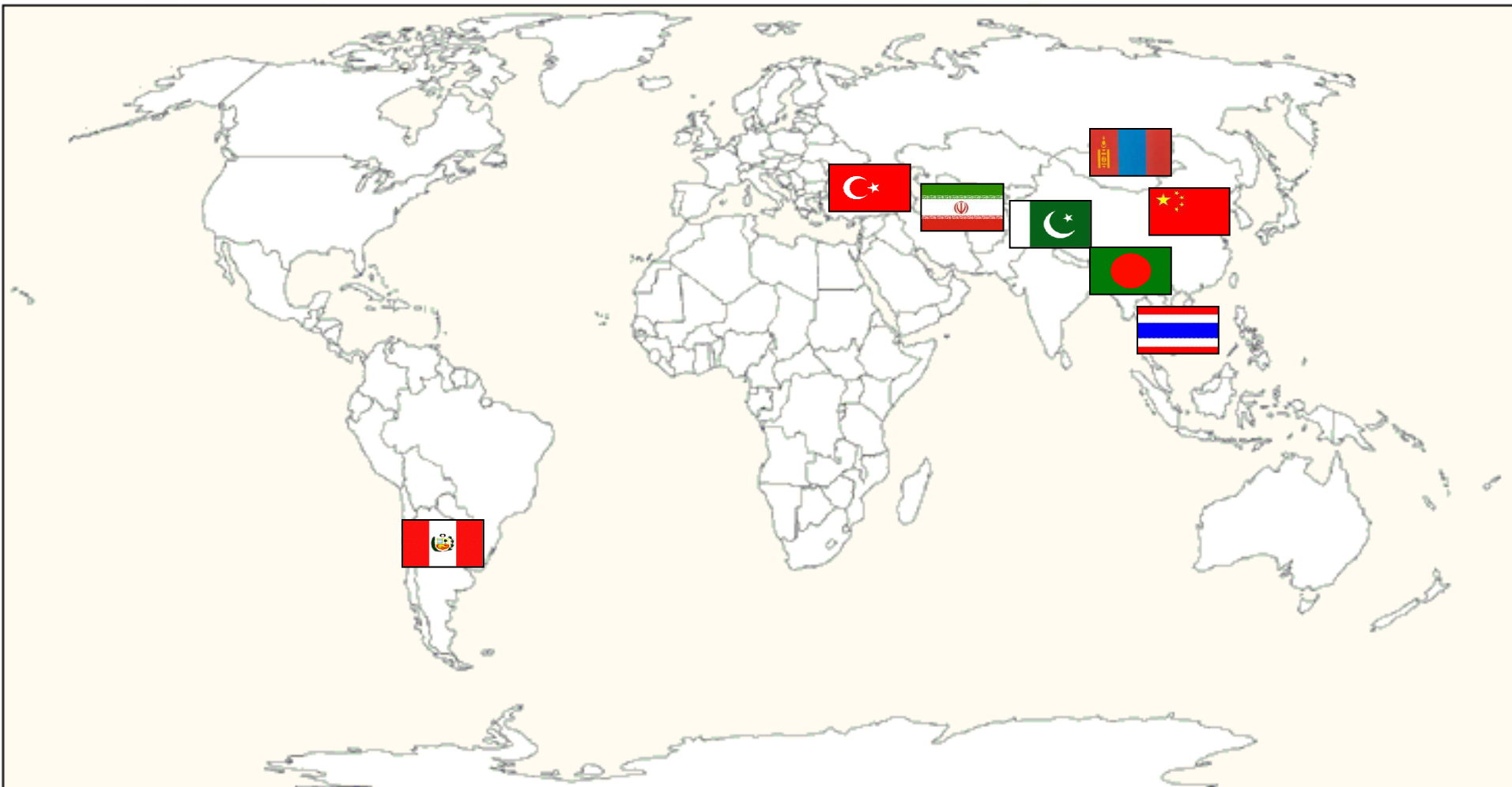
## **Established to pooling up and Sharing the MS resources for Peaceful Uses of Outer Space**

- 1992,11. Workshop on Multilateral Cooperation in Space Technology and Applications
- 2008,12 The Inauguration Ceremony of APSCO was held in Beijing



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# *APSCO Member States*



Signatory State



Associate Member



Observer State



The Secretariat has four Departments working under the order of APSCO Council.

**APSCO COUNCIL**

**Secretary-General**

Deputy  
Secretary-General

**APSCO Secretariat**

Department of  
External Relations  
& Legal Affairs

Department of  
Strategic Plan  
& Program  
Management

Department of  
Education/Training  
& Database  
Management

Department of  
Administration  
& Finance





- On the theme of “the Belt and Road Initiative for facilitating space capabilities building of the Asia Pacific countries”. APSCO held its Development Strategy Forum in Beijing on October 27, 2015
- Adopted ‘2015 Beijing Declaration’ with five action points
  - ① Space Capacity Building
  - ② Sharing Service Capability
  - ③ Quick Response Capability
  - ④ Industry Driving Capability
  - ⑤ Information inter-connection





## ***① Space Capacity Building***

- Education and Training to share knowledge and technology
- Undertaking activities in Space Science, Technology, Applications.
- Space Law, Policies and Regulations.

## ***② Improve Sharing Service Capability***

- Sharing data in the areas of remote sensing, telecommunication, meteorology, navigation, space weather and space debris
- Developing APSCO Telemetry, Tracking and Command (TT&C) network and sharing services

## ***③ Improve the Quick Response Capability***

- Quick Response Capability including fast acquisition, cooperative analysis and judgment
- Emergency rescue and response capability in the areas covered by the space information.



## **④ Improve the Industry Driving Capability**

- Jointly support satellite communications, navigation, remote sensing, data collection and value-added services in the space-based information applications
- Make use of the leading and driving effects of space information
- Boost the development of space industry

## **⑤ Improve information inter-connection**

- Improve infrastructure construction and information services through space technology such as remote sensing, telecommunication and navigation.





Areas	Project	Current Status
Space Technology	<p><b>2 Exchange Platform</b></p> <p><b>4 Ways of Training &amp; Education</b></p> <p><b>6 Networks</b></p>	Preparation for Implementation
Space Science		Implementation Phase
Space Application		Implementation Phase
Education & Training	Establishment of the Education and Training Center of APSCO	Implementation Phase
	APSCO Small Student Satellites joint development among Universities of MS	Preparation for Implementation



### ① APSCO International Symposium

- Exchange achievements of scientists and technologists among the worldwide
- Pooling experience of cooperation.



### ② Space Law and Policy Forum

- Space law workshop with UN OOSA
- Create awareness at decision-makers level of the Member States





### ① Degree Education

- MASTA & DOCSTA program cooperate with BUAA and National Scholarship of China

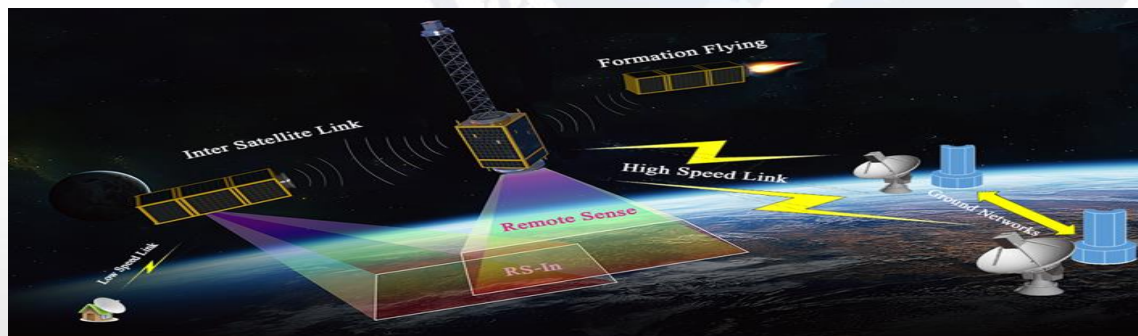
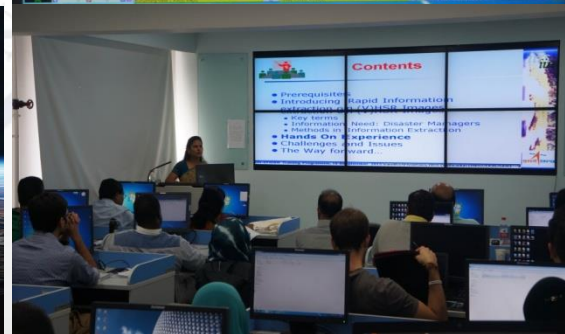
### ② Short term & On-line Training

### ③ New Generation Cultivating

- Space Science School
- Space Innovation Competition

### ④ Technology Transfer

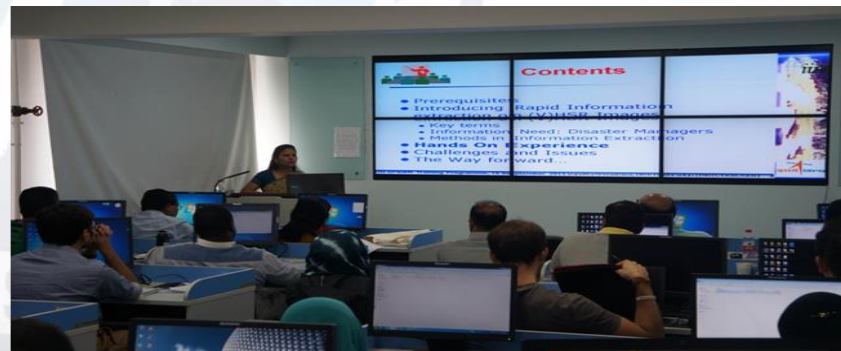
- Small Student Satellite (SSS)
- Space Education Curricula Development





# ① Education and Training Center/Network

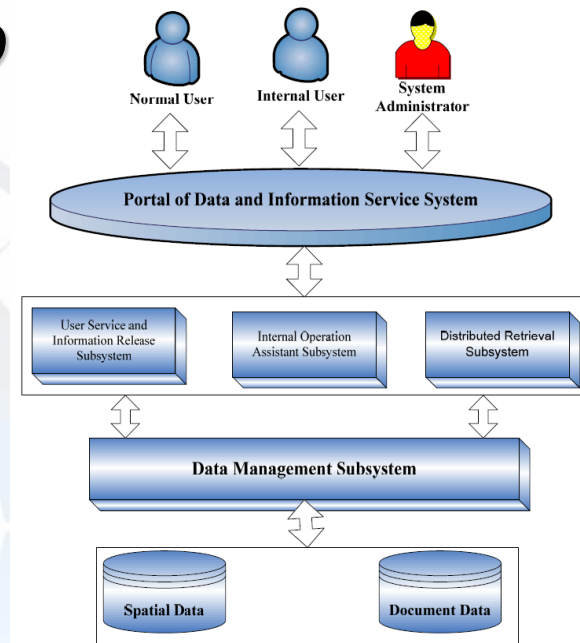
➤ A Network for frequent Exchange of Knowledge among MS





## ② Data Sharing Service Platform (DSSP)

- **Network for sharing satellite data**
  - Data provided by 9 Earth-observation satellites from China
  - Turkey, Pakistan, Peru data will join in
  - More than 70,000 satellite images
  - More than 20 million km<sup>2</sup> coverage area
  - Providing almost 1000 scenes/year to each MS of different resolution level
  - 35 Authorized Users
- **Enhanced Database**
  - Meteorological satellite data
  - Space and ground-based measurement data
  - Knowledge management database
  - APSCO Center of Excellence







### ③ *Asia-Pacific Ground-Based Optical Space Objects Observation System (APOSOS)*

#### ➤ **Ground-based Space Objects Observation Network**

- Telescope Diameter: 150 mm
- Aperture : 150 mm
- Focal length: 500 mm
- APOSOS Data Process and Service Center

#### ➤ **Peaceful use for**

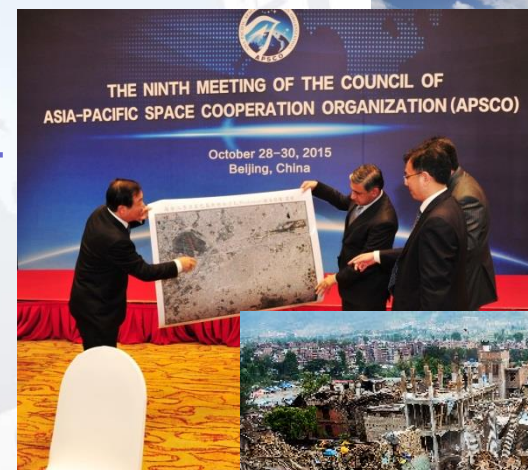
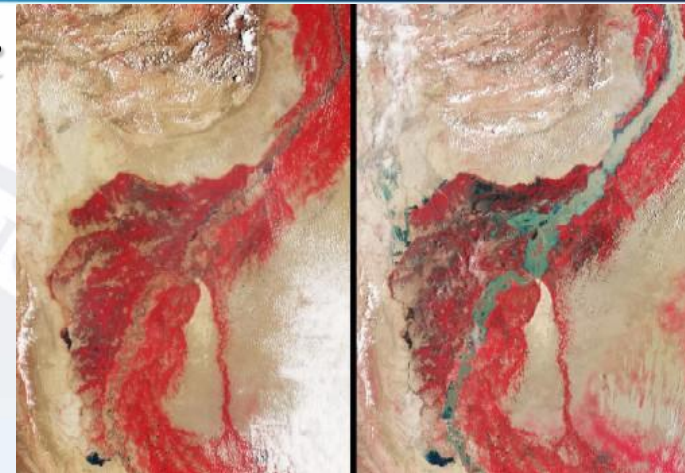
- Space object detecting, tracking and identifying
- Orbit determination and cataloging
- Collision early warning
- Space debris re-entry prediction





### ④ *Disaster Monitoring Network*

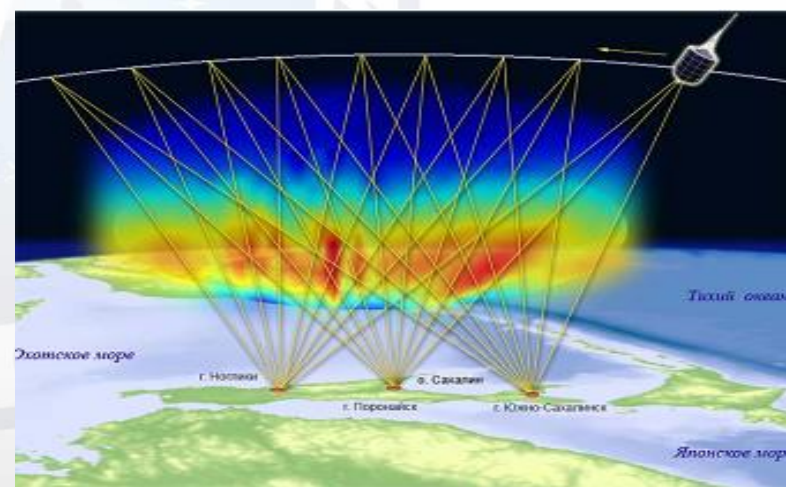
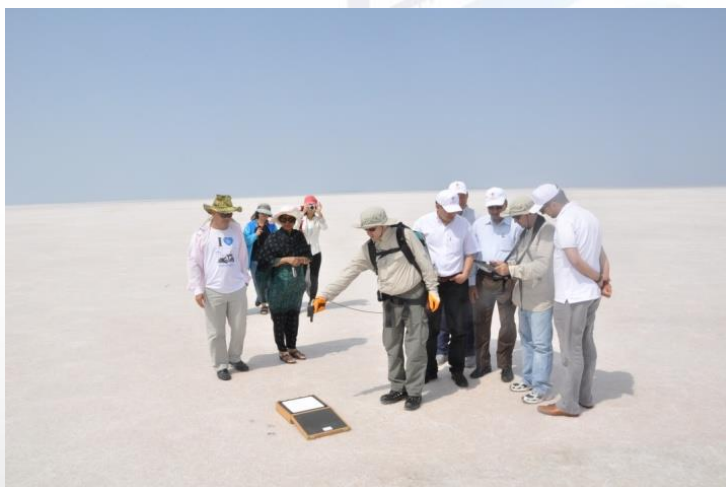
- Remote Sensing Techniques for Drought Study
- Estimation of Rice Field Using Satellite Sensors
- Compatible GNSS Terminals for Emergency Management and Disaster Rescue
- Determining Precursor Ionospheric Signatures of Earthquakes by Ground-Based Ionospheric Sounding
- Framework for Researches on Application of Space Technology for Disaster Monitoring in the APSCO Member States
- CHARTER similar mechanism & Seek to become a member of CHARTER





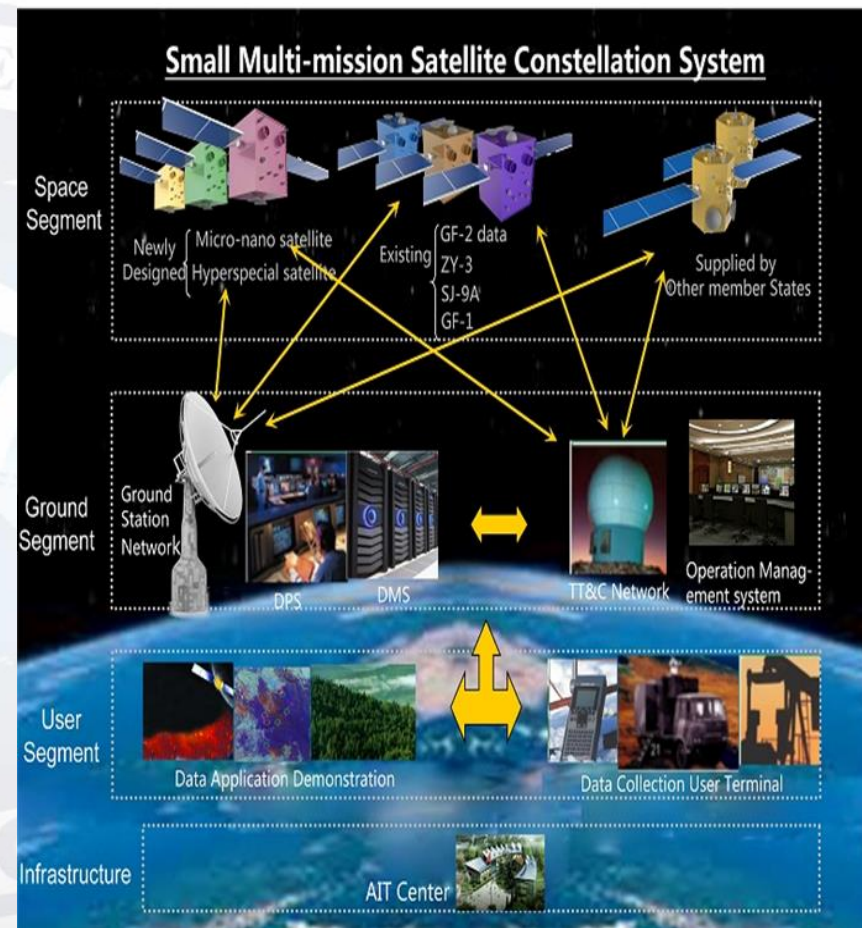
## ⑤ *Space Technology Application Network*

- **COMSAT-Based Tele-Medicine Network**
- **Radiometric Calibration for Satellite Sensors Network**
- **Ionosphere Modeling through Study of Radio Wave Propagation and Solar Activity**
- **Ka-Band Rain Attenuation Modeling**
- **Communication, Navigation, Observation**



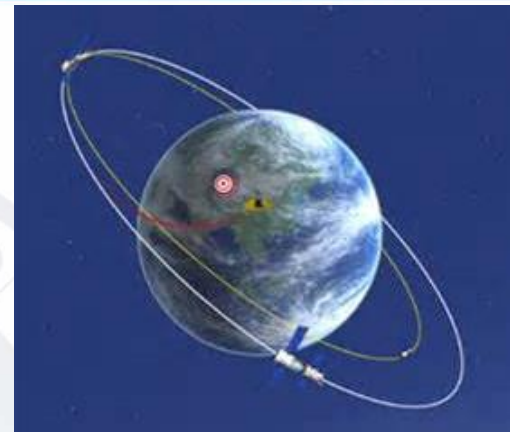
## ⑥ APSCO Joint SMMS Constellation

- **The space segment**
  - 3 operating satellites donated by China
  - 2 newly developed EO satellites
  - 6 nano/micro satellites for quick response communication
  - participating satellites from MS
- **Asia-Pacific Ground Station Network**
  - Existing network in China
  - Compatible upgraded stations in MS
- **Shared AIT Facilities**
- **Hands-on technology transfer**

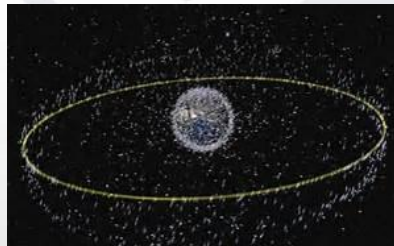




- ✓ Sharing data and resources
- ✓ Hands-on technology transfer
- ✓ Stronger space governance
- ✓ Networking Member States



– The objective of all these approaches is to help MS to overcome technological limitation and facilitate their space capability building





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- 1. Establish the Treaty of Space Cooperation**
- 2. Establish the Globe Land, Sea & Air Transportation Safety Constellation**  
*Surveillance, Search & Rescue. Real time*





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- A**ctive Involvement in international space affairs
- P**eaceful use of outer space
  - S**haring knowledge and experiences
- C**ollaborative gains with its Member States
- O**pen worldwide to international space communities

# Thank You!