Update of BDS/GNSS International Education and Capacity Building

14th Meeting of the International Committee on Global Navigation Satellite Systems

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BeiDou International Exchange and Training Center of China Navigation System Office (BD-IETC of CNSO)

2019-12-10
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01 BDS/GNSS International Education 2019
02 RCSSTEAP Capacity Building & Outcomes
BDS/GNSS International Education 2019
I. BeiDou International Exchange and Training Center

- **Established** on 24 August, **2012**
- **Supported** by China Satellite Navigation Office (CSNO)
- **Hosted** by Beihang University, China
BD-IETC aims to be

- the base of international exchange and training on BDS/GNSS.
  - To plan and conduct BDS/GNSS international exchange and training activities.
  - To explore and integrate domestic/international GNSS educational resources

- an important network node of GNSS international education.
  - To expand the channels of international exchange and cooperation
  - To share the resources of experts and corporate partners at home and abroad
  - To put emphasis on brand operation and international influence enhancement
  - To promote the global popularization and applications of BDS/GNSS.
## II. International Education and Training Programs

<table>
<thead>
<tr>
<th></th>
<th>Short Program</th>
<th>Middle Program</th>
<th>Long Program (Degree Program)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trainee</td>
<td>Officers and managers</td>
<td>Technicians and engineers</td>
<td>Overseas students (major in navigation)</td>
</tr>
<tr>
<td>Period</td>
<td>3-5 days</td>
<td>1-3 months</td>
<td>1-2 years</td>
</tr>
<tr>
<td>Form</td>
<td>Lectures given by famous</td>
<td>Courses and experiments mainly</td>
<td>Specialized courses and thesis research</td>
</tr>
<tr>
<td></td>
<td>navigation experts related to BDS/GNSS</td>
<td>focused on basic principles of GNSS</td>
<td>(degree award by Beihang Uni.)</td>
</tr>
</tbody>
</table>
GNSS Degree Program

12 months
Thesis

3 months
Team Project

6 months
Course Study

Topic Opening  Thesis Research  Mid-term Check  Final Defense

Team  Opening  Defense  Demo

Frontier

GNSS New Technologies

App

GNSS Experiment  GNSS Applications  Satellite Navigation Data Processing

Prof. Skills

GNSS Reference System  Principle of GNSS  GNSS Receiver Principles and Design  GNSS/INS Integration Navigation

General Basis

Chinese Language & Intro. to China  Space Technology & Space Economy  Space Environment, Orbit & Spacecraft Systems

Math Basis

Probability and Statistics  Theory of Matrix  Numerical Analysis  Matlab Programming
Master’s Degree Program

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
<th>Countries of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>20</td>
<td>Indonesia, Iran, Mongolia, Pakistan, Peru, Spain, Thailand</td>
</tr>
<tr>
<td>2013</td>
<td>13</td>
<td>Bangladesh, Indonesia, Iran, Mongolia, Pakistan, Peru, Thailand</td>
</tr>
<tr>
<td>2014</td>
<td>10</td>
<td>Indonesia, Mongolia, Nigeria, Pakistan, Peru, Thailand</td>
</tr>
<tr>
<td>2015</td>
<td>6</td>
<td>Algeria, Bangladesh, Indonesia, Mozambique, Pakistan</td>
</tr>
<tr>
<td>2016</td>
<td>10</td>
<td>Bolivia, Brazil, Croatia, Iran, Nigeria, Peru, Thailand, Ukraine, Venezuela</td>
</tr>
<tr>
<td>2017</td>
<td>11</td>
<td>Bangladesh, Bolivia, Mongolia, Pakistan, Peru, Thailand, Turkey</td>
</tr>
<tr>
<td>2018</td>
<td>6</td>
<td>Ethiopia, Iran, Pakistan, Peru, Turkey</td>
</tr>
<tr>
<td>2019</td>
<td>12</td>
<td>Peru, Bolivia, Iran, Turkey, Mongolia, Pakistan, Nigeria, Togo, Egypt, Algeria</td>
</tr>
</tbody>
</table>

• 2012-2019, totally 88
BDS/GNSS International Education 2019

**Doctoral Degree Program**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
<th>Countries of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>2</td>
<td>Thailand</td>
</tr>
<tr>
<td>2014</td>
<td>3</td>
<td>Bangladesh, Iran, Thailand</td>
</tr>
<tr>
<td>2015</td>
<td>5</td>
<td>Mongolia, Peru, Thailand</td>
</tr>
<tr>
<td>2016</td>
<td>6</td>
<td>Bangladesh, Indonesia, Myanmar, Nigeria, Venezuela</td>
</tr>
<tr>
<td>2017</td>
<td>2</td>
<td>Iran</td>
</tr>
<tr>
<td>2018</td>
<td>4</td>
<td>Indonesia, Iran, Pakistan</td>
</tr>
<tr>
<td>2019</td>
<td>3</td>
<td>Iran, Pakistan, Myanmar</td>
</tr>
</tbody>
</table>

- 2013-2019, totally 25

Update of GNSS/BDS International Education and Capacity Building
Degree Award

- Thailand: 22
- Pakistan: 16
- Iran: 9
- Mongolia: 9
- Peru: 8
- Bengal: 6
- Nigeria: 6
- Indonesia: 4
- Bolivia: 3
- Algeria: 2
- Brazil: 2
- Croatia: 2
- Venezuela: 2
- Ukraine: 2
- Myanmar: 1
- Mozambique: 1
- Spain: 1
- Bangladesh: 1

2012-2019 Student Number (totally 97)
BDS/GNSS International Education 2019

Training Activities 2019

GNSS Basic Courses Middle Term Training

<table>
<thead>
<tr>
<th>No.</th>
<th>Course Name</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Principles of Global Navigation Satellite Systems</td>
<td>21</td>
</tr>
<tr>
<td>2</td>
<td>GNSS Navigation Signals</td>
<td>21</td>
</tr>
<tr>
<td>3</td>
<td>GNSS High Precision Data Processing</td>
<td>21</td>
</tr>
<tr>
<td>4</td>
<td>GNSS Experiment</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>GNSS/INS Integrated Navigation</td>
<td>21</td>
</tr>
<tr>
<td>6</td>
<td>GNSS Application</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>GNSS Surveying and Mapping Technique</td>
<td>21</td>
</tr>
<tr>
<td>8</td>
<td>IGMAS Precision products and time-frequency applications</td>
<td>15</td>
</tr>
<tr>
<td>9</td>
<td>GNSS Software Receiver</td>
<td>21</td>
</tr>
</tbody>
</table>
BDS/GNSS Training of China-Arab BDS Cooperation Forum

April 1-2, 2019 in Tunisia

Totally 48 trainees from Tunisia, Egypt, Algeria, Iraq, and Mauritania
Update of GNSS/BDS International Education and Capacity Building

III. International Education Cooperation 2019

China-Croatia Education Cooperation

The course “GNSS Data Processing” by Prof. Renato from the University of Rijeka
April 15-20, 2019 at Beihang University

13th Annual Baska GNSS Conference
May 12-16, 2019 in Baska, Croatia
China-Brazil Cooperation on GNSS Agriculture Applications

June 17-18, 2019 in Brazil

MoU on GNSS Agriculture Applications
Cooperation with the University of Sao Paulo,
June 17, 2019 in Sao Paulo

3rd Brazil-China High Level Dialogue on
Science, Technology and Innovation,
June 18, 2019 in Brasilia
BDS/GNSS International Education 2019

United Nations/Fiji Workshop on the Applications of GNSS
June 24-28, 2019 in Suva, Fiji

“Capacity Building of GNSS Education in China and its enlightenment”

Agreement on BDS Applications cooperation with Fiji National University
The 6th meeting of China-Russia Cooperation Committee on Satellite Navigation
Aug. 28-29, 2019 in Kazan, Russia.


The 6th meeting of China-Russia Cooperation Committee on Satellite Navigation was held in Kazan, Russia from Aug. 28-29, 2019. The meeting was attended by representatives from the China National Satellite System Management Office and the Russian Ministry of Communications and Mass Media. The meeting aimed to strengthen the cooperation between the two countries in satellite navigation education and training.

The protocol was signed by representatives from the two countries. The signing ceremony was witnessed by both the Chinese and Russian delegations.

The protocol covers various aspects of satellite navigation education and training, including curriculum development, student exchanges, and joint research projects.

The protocol also emphasizes the importance of sharing best practices and promoting mutual understanding and respect.

In conclusion, the protocol marks a significant step towards strengthening the collaboration between China and Russia in the field of satellite navigation education and training.

Signed by:

[Signatures]

[Date]

Kazan, Russia
China-Uzbekistan Education Cooperation

Agreement of cooperation in research, education and training program with Tashkent University of Information Technologies

May 21-26, 2019 in Beijing, China

Nov. 3-8, 2019 in Tashkent, Uzbekistan

Update of GNSS/BDS International Education and Capacity Building
RCSSTEAP Capacity Building & Outcomes
I. RCSSTEAP (China) (Affiliated to the United Nations)

- **Established** on 17 Nov, 2014
- **Supported** by Committee on the Peaceful Uses of Outer Space (UN-COPUOS) and China National Space Administration (CNSA)
- **Hosted** by Beihang University, China
RCSSTEAP aims to be

- an education and training entity supported by UN-COPUOS.
  - To promote the peaceful use of space technologies for the benefit of humanity.
  - To sensitize the countries within the region about space science and technology activities by educating and creating awareness through training, workshops, short courses and outreaches.
  - To facilitate the UN “Space Applications Programme” promoted by UN-COPUOS.
  - To enhance the education and training level as well as application capacity of space science and technology in the Member States of the Centre through capacity building, information communication, training programs and professional visits.
II. Development Mode

**UGII Mode**

**U** — Hosted by **U**niversity  
**G** — Supported by Chinese **G**overnment  
**I** — Work with Related **I**nternational Organizations  
**I** — Industry/Enterprise Participation
III. Training programs

- Global Navigation Satellite System & Satellite Communications (GNSS&SC)
- Remote Sensing & Geographic Information Systems (RS&GIS)
- Micro-satellite Technology
- Space Law and Policy
- Space Science and Environment (2020)

- Space Technology Application (STA)
  - Master’s Program
  - Doctoral Program

- Degree Program
- International Exchange
- Summer School
- Non-degree Program
- Short Term Training
- Capacity Building
RCSSTEAP Capacity Building & Outcomes

Degree programs

MASTA & DOCSTA (2015-2019)

- Totally 237 from 24 countries
RCSSTEAP Capacity Building & Outcomes

➢ Short-term Training

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Number</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr.19-29</td>
<td>Global Navigation Satellite Technology and Application</td>
<td>43</td>
<td>Algeria, Bolivia, Brazil, China, Croatia, Indonesia, Laos, Mongolia, Myanmar, Nigeria, Pakistan, Peru, Slovakia, Thailand, Turkey, Venezuela</td>
</tr>
<tr>
<td>Sept.14-22</td>
<td>Remote Sensing Technology and Application</td>
<td>30</td>
<td>Algeria, Bangladesh, Bhutan, Brazil, China, Ethiopia, Indonesia, Iran, Oman, Pakistan, Peru, Mongolia, Mozambique, Myanmar, Nigeria, Saudi Arabia, Singapore, Thailand, Turkey, Venezuela</td>
</tr>
<tr>
<td>Sept.17-25</td>
<td>Space Law and Policy</td>
<td>38</td>
<td>Bangladesh, Bolivia, Brazil, China, Egypt, Indonesia, Mongolia, Pakistan, Peru, Thailand, Turkey, Venezuela</td>
</tr>
</tbody>
</table>

Participants in total: 111
# RCSSTEAP Capacity Building & Outcomes

## Short Training Programmes in 2016

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Number</th>
<th>Countries of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar. 26-30</td>
<td>China Remote Sensing Technology and Data Applications</td>
<td>46</td>
<td>Algeria, Bangladesh, Bolivia, Brazil, Indonesia, Iran, Laos, Mongolia, Mozambique, Nigeria, Pakistan, Peru, Slovakia, Thailand, Venezuela</td>
</tr>
<tr>
<td>May. 8-20</td>
<td>International GNSS Seminars “GNSS Courses for curious minds”</td>
<td>31</td>
<td>Algeria, Bangladesh, Bolivia, Brazil, China, Iran, Mozambique, Nigeria, Pakistan, Peru, Saudi Arabia, Thailand, Venezuela</td>
</tr>
<tr>
<td>Jul. 11-30</td>
<td>Beidou Technology and its Applications</td>
<td>37</td>
<td>Cambodia, Egypt, Iran, Iraq, Malaysia, Mongolia, Morocco, Nigeria, Oman, Pakistan, South Africa, Thailand, Uganda, Venezuela, Zambia</td>
</tr>
<tr>
<td>Sept. 22-27</td>
<td>Space-based Technologies for Flood and Drought Monitoring Risk Assessment</td>
<td>28</td>
<td>Bangladesh, Ghana, Guatemala, India, Iran, Italy, Kyrgyzstan, Mongolia, Mozambique, Nepal, Nigeria, Pakistan, Peru, Sudan, Thailand, Trinidad and Tobago, Turkey, Zimbabwe</td>
</tr>
<tr>
<td>Oct. 14-16</td>
<td>The “Belt and Road Initiative” Spatial Information Corridor Engineering Application</td>
<td>45</td>
<td>Algeria, Bangladesh, Bolivia, Brazil, Croatia, Indonesia, Iran, Laos, Mongolia, Nigeria, Pakistan, Peru, Thailand, Turkey, Ukraine, Venezuela</td>
</tr>
<tr>
<td>Oct. 31-Nov.8</td>
<td>Navigation and Positioning Satellite System Design</td>
<td>31</td>
<td>Algeria, Bangladesh, China, Indonesia, Iran, Laos, Mongolia, Mozambique, Pakistan, Peru, Thailand, Turkey</td>
</tr>
</tbody>
</table>

## Short Training Programmes in 2017

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Number</th>
<th>Countries of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 9-11</td>
<td>Remote Sensing Technology and Application</td>
<td>40</td>
<td>Belgium, France, Germany, Italy, Luxembourg, Netherlands</td>
</tr>
<tr>
<td>Aug. 14-Sept. 1</td>
<td>The First Summer Camp of the AUCDO Student Small Satellite Project</td>
<td>47</td>
<td>Bangladesh, China, Iran, Mongolia, Pakistan, Peru, Thailand, Turkey</td>
</tr>
<tr>
<td>Oct. 25-31</td>
<td>Integration of Multisource Earth Observation Data for Disaster Damage Assessment</td>
<td>46</td>
<td>Bangladesh, China, Fiji, Ghana, India, Indonesia, Iran, Kenya, Mongolia, Mozambique, Myanmar, Nigeria, Pakistan, Peru, Sudan, Thailand, Turkey</td>
</tr>
<tr>
<td>Nov. 17-19</td>
<td>China Satellite Service and Big Data Analysis &amp; Application for Remote Sensing</td>
<td>51</td>
<td>Algeria, Bangladesh, Bolivia, Brazil, China (Hong Kong), Iran, Malaysia, Mongolia, Nigeria, Pakistan, Peru, Thailand, Turkey, Venezuela</td>
</tr>
</tbody>
</table>

Participants in total: 235

## Short Training Programmes in 2018

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Number</th>
<th>Countries of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr. 11-23</td>
<td>GNSS</td>
<td>42</td>
<td>Egypt, Morocco, Tunisia</td>
</tr>
<tr>
<td>Apr. 12-26</td>
<td>Space Cooperation for Global Health</td>
<td>43</td>
<td>Bangladesh, Bolivia, Ethiopia, India, Iran, Italy, Madagascar, Mongolia, Nepal, Nigeria, Pakistan, Peru, Philippines, Russia, Tanzania, Venezuela, Zambia</td>
</tr>
<tr>
<td>Apr. 23-27</td>
<td>Beidou / GNSS</td>
<td>35</td>
<td>Algeria, Cameroon, Central African Republic, Morocco, Niger, Senegal, Tunisia</td>
</tr>
<tr>
<td>Sep. 24-25</td>
<td>Beidou / GNSS</td>
<td>165</td>
<td>Egypt, Lebanon, Sudan, Zambia</td>
</tr>
<tr>
<td>Oct. 22-26</td>
<td>Satellite Technology</td>
<td>32</td>
<td>Morocco, Nigeria, Algeria and other Arab league countries</td>
</tr>
<tr>
<td>Oct. 28-Nov.01</td>
<td>Space based technology for emergency response</td>
<td>27</td>
<td>Bangladesh, Brazil, China, Ghana, India, Iran, Laos, Mongolia, Mozambique, Pakistan, Peru, Thailand, Turkey, Vietnam</td>
</tr>
</tbody>
</table>

Participants in total: 342

**Update of GNSS/BDS International Education and Capacity Building**
### RCSSTEAP Capacity Building & Outcomes

#### Short Training Programmes in 2019

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Number</th>
<th>Countries of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr. 1-2</td>
<td>BeiDou/GNSS</td>
<td>48</td>
<td>Algeria, Egypt, Iraq, Mauritania, Tunisa</td>
</tr>
<tr>
<td>Sept. 5-10</td>
<td>Space-based Technologies for Disaster Risk Assessmen</td>
<td>28</td>
<td>Algeria, Bangladesh, China, Ethiopia, India, Indonesia, Iran, Mongolia, Nepal, Nigeria, Pakistan, Peru, Thailand, Turkey</td>
</tr>
<tr>
<td>Sept. 16-29</td>
<td>Capacity Improvement of Addressing Climate Change through Space Technology</td>
<td>29</td>
<td>Argentina, Bangladesh, Cambodia, Cameroon, Chile, Ecuador, Egypt, Ghana, Kenya, Malaysia, Morocco, Namibia, Senegal, Thailand, Tunisia, Turkey, Zambia</td>
</tr>
<tr>
<td>Sept. 24-25</td>
<td>SuperMap Software and Its Applications</td>
<td>23</td>
<td>Algeria, Bangladesh, Bolivia, Mongolia, Pakistan, Peru, Spain, Venezuela</td>
</tr>
</tbody>
</table>

**Total: 128 participants from 33 countries**

- 2015-2019, more than one thousand participants from 64 countries
IV. Capacity Building

➢ Globalization of Faculty

Professors and Experts of the Centre 2015-2019

- Domestic Universities: 61
- Domestic Industries: 37
- Domestic Research Institutes: 33
- International Universities: 25
- Domestic Government Ministries & International Organizations: 14
- International Research Institutes & Government Ministries: 9

Totally 179
RCSSTEAP Capacity Building & Outcomes

➢ Educational Facilities
RCSSTEAP Capacity Building & Outcomes

➢ Research Facilities

Micro-satellite Technology Laboratory
RS Ground Station
BDS Constellation
Distance Education Laboratory

Micro-satellite Mission Control Centre
RS&GIS Laboratory
GNSS Smart Room
Smart Classroom
02 RCSSTEAP Capacity Building & Outcomes

➢ Brand Promotion

Update of GNSS/BDS International Education and Capacity Building
V. International Exchange

Update of GNSS/BDS International Education and Capacity Building
RCSSTEAP Capacity Building & Outcomes

➢ Alliance of Regional Centres
RCSSTEAP Capacity Building & Outcomes

➢ Aerospace Technology and Culture Journey
Regional Centre for Space Science and Technology Education in Asia and the Pacific (China)
(Affiliated to the United Nations)

联合国附属空间科技教育亚太区域中心（中国）

The 5th Anniversary &
International Space Education Forum

December 9, Beijing, China
Thanks for your attention and support for BDS!