United Nations
Educational, Scientific and
Cultural Organization

International Centre on Space Technologies for
Natural and Cultural Heritage
under the auspices of UNESCO

Belt and Road
Cultural Heritage
Global Alliance
“一带一路”文化遗产国际合作联盟

Competition on Discovering Historical Cultural Heritage with Eye in Space

December 2021 to January 2022

Competition on Discovering Historical Cultural Heritage with Eye in Space

Announcement

Ⅰ、Background

Future generation development is one of the priority areas for APSCO. With the development of society and economy, Space Science and Technology has played an important role in our daily life, as mankion it, cultivating younger generation’ s interest in space science and technology, selecting potential future space leaders has become a task for all Member States.

In this regard, APSCO has been committed to cultivating the next generation of aerospace talents for its Member States since its establishment. After years of exploration and practice, it has achievedAsia-Pacific Space Cooperation Organization (APSCO) has not only paid attention to the traditional fields of space science and technology and applications, but also made attempts in new fields of spac

Ⅱ、Competition Introduction

The theme of APSCO Competition on Discovering Historical Cultural Heritage with Eye in Space is "Peaceful Use of Space, Exploring New Application Fields of Space Science and Technology". This competition will be carried out in integrated model of "training (optional) + competition".

This competition is based on remote sensing technology and applications. The competition expert committee will provide images (medium resolution, high resolution and ultra-high resolution) of the designated areas, the research area includes artificial features: large-scale linear features and small-scale planar features as well as natural features. Participates are required to use remote sensing processing software (PIE) proficiently, use related knowledge, find targets in designated areas, combine literature information, analyze and finally determine man-made objects ruins as much as possible:

Specific requirements are as follows

- Use medium-resolution remote sensing images to analyze the geographic environment of the designated areas and identify man-made objects relics.
- Use high-resolution remote sensing images to identify the spatial structure of the discovered targets, and use GIS technology to draw their spatial structure maps to produce remote sensing archaeological thematic maps.

- Combine historical literature knowledge with geographic space environment; Use multi-source remote sensing data and GIS spatial analysis functions; Comprehensive analysis of the relationship between ancient man-made objects and the natural environment, as well as today's cultural heritage protection problems; Make spatial archaeological analysis thematic maps； If possible, make a virtual reality view of the manmade objects.
- Because this competition is based on PIE software, in order to let everyone better understand remote sensing processing software, APSCO will arrange corresponding software training before the competition. We welcome all contestants to participate in the software training. During training and competitions, the PIESAT will facilitate all contestants to use the software for free.

Ⅲ、Activity Objectives

This competition serves the United Nations' 2030 Sustainable Development Goals and aims to stimulate the enthusiasm of university students and young scholars from APSCO Member States to explore new areas of space technology applications. Besides, it provides participants with opportunities to exchange learning and apply space knowledge, and encourages contestants to use earth observation space big data to explore scientific cooperation about earth sciences, data, technology, and applications.

Ⅳ、Partners

The competition is jointly organized by APSCO, HIST, PIESAT, BRAIA, BRCHGA and IGU-COG. (Please refer to Attachment for brief introduction of all units.)

Ⅴ、Activity Content

The activity will be conducted online by two segments:

(1) Training- APSCO Training Course on Remote Sensing Data Processing and Applications

The online training lasts for 6 days, 3 hours per day. Considering that the participants come from different time zones, this training has two time schedules to choose from, and the training content of the two time schedules is exactly the same.

Training Course Content:

- DOM production based on satellite image data (PIE-Ortho)
- DOM production based on UAV image（PIE-UAV)
- Supervised classification based on fully-polarized SAR data (PIE-SAR)distribution (PIE-Basic)
- Flood remote sensing monitoring (PIE-SIAS)
- Space archaeology (in charge by HIST)

(2) Competition on Discovering Historical Cultural Heritage with Eye in Space

Released by APSCO, BRCHGA and the BRAIA Member States/Members.

Ⅵ、Activity Procedures

- 2021.08.24: Competition Organizing Committee releases competition announcement;
- 2021.10.11-2021.10.15: All participants submit registration form for the competition;
- 2021.11.22-2021.12.03: Competition Organizing Committee organize all participates install and test PIE software;
- 2021.11.29-2021.11.30: Competition Organizing Committee distributes competition handbook;
- 2021.12.06-2021.12.10 & 2021.12.13-2021.12.17: APSCO and PIESAT conduct remote sensing processing software (PIE) training;
- 2022.01.06 & 2022.01.07: HIST conducts Space archaeology Training
- 2022.01.10-2022.01.14: Competition Organizing Committee organizes competition

Ⅶ、Participants and Award Setting

(1) Participants

- Senior undergraduates, postgraduates, and doctoral students;
- Researchers from related scientific research institutions;
- Space technology enthusiasts.

Each group should contain no more than 3 participants and they may be from different organizations. Each group can have 1 instructor for guiding their work.

(2) Competition awards setting：

The first, second, third prize and others award.

Ⅷ、Contest Promotion

The publicity channels of this competition include：

1/ APSCO official Website

2/ NPU official Website

3/ PIESAT official Website

Ⅸ、Contest Organization

In order to ensure the smooth progress of the competition, the competition committee will be set up accordingly, including：

1/ Competition Expert Committee

Inviting experts in this field to serve as professional instruction and judges for the competition.

2/ Competition Organizing Committee

Ensure the contest organized successfully, and be responsible for the related affairs of the contest.

Ⅹ、Others

More specific requirements progress and related materials of above-mentioned training and competition will be provided in the competition handbook.

Attachment

Brief introduction of Organizers/Co-organizers

APSCO:

Asia-Pacific Space Cooperation Organization (APSCO) is an inter-governmental organization, with full international independent status. It was officially established in 2008, headquartered in Beijing, China. APSCO has 8 Member States, namely Bangladesh, China, Iran, Mongolia, Pakistan, Peru, Thailand, and Turkey, 1 Signatory Sates Indonesia, 1 associated Member Egypt, and 2 Observers Mexico and ISNET. APSCO obtained the permanent observer at UN-COPUOS. With the theme of peaceful uses of outer space, APSCO is devoted on tapping regional resources to facilitate capacity building in space related fields and provides a cooperative mechanism for member countries to be able to main stream peaceful use of space as a driver for socio-economic development.

HIST:

The International Centre on Space Technologies for Natural and Cultural Heritage is the first UNESCO Category 2 Centre dedicated to promoting, testing and demonstrating the applications of space technologies for the conservation, management and sustainable development of World Heritage sites, World Biosphere Reserves and Global Geoparks (hereinafter called “UNESCO Sites”). It was established in Beijing in July, 2011 and hosted by the Aerospace Information Research Institute of the Chinese Academy of Sciences.

HIST offers an authoritative international communication platform for world heritage research using space technology. By using remote sensing technology, HIST scientific team have discovered that the tandem system of ancient rivers and lakes covered by dry sand in the Alashan plateau and the ancient Great Wall of China in Sui and Ming Dynasties. To discovery the large-scale archaeology sites, remote sensing technology has advantages that other technologies cannot match.

PIESAT:

PIESAT Information Technology Co., Ltd. (PIESAT, stock code: 688066) is a leading satellite operation and application service provider in China since 2008, and one of the first batch of listed enterprises in the STAR Board of Shanghai stock market. PIESAT has independently developed the PIE (Pixel Information Expert) remote sensing software with intellectual property, and the first Chinese remote sensing cloud service platform named PIE-Engine, realizing the independent research and development of basic remote sensing software.

The company has established overseas subsidiaries in Hong Kong, Sydney, London, Geneva, with business covering Asia, Europe, Australia and other regions. It provides basic software products, system design and development, remote sensing cloud services and other spatial application solutions for government sectors, enterprises, universities, etc.

BRAIA:

Belt and Road Aerospace Innovation Alliance (BRAIA), established on April 23, 2017 in Xi’ an, was initiated by Northwestern Polytechnical University (NPU) and Chinese Society of Astronautics (CSA). BRAIA is an international organization with NPU serving as its Permanent Secretariat and formed by universities, research institutes,academic organizations and enterprises mainly in the field of aerospace.

The mission of BRAIA is to enhance the international cooperation on aerospace technology and application. Its focus is to promote the substantial cooperation among BRAIA members in talent cultivation, scientific research, technology development and applications, etc.

BRAIA now has 63 members from 21 countries including Algeria, America, Argentina, Australia, Bangladesh, Belgium, China, Egypt, France, Italy, Malaysia, Mexico, Nepal, Nigeria, Pakistan, Poland, Russia, Spain, Tunisia, Ukraine and United Kingdom.

BRCHGA:

The Belt and Road Cultural Heritage Global Alliance was established on May 11, 2019 guided by Shaanxi Provincial Cultural Heritage Administration (SPCHA), China. The 53 initial members of the alliance come from 14 countries including Azerbaijan, Italy, Kazakhstan, Kyrgyzstan, Mongolia, Poland, Russia, Slovakia, Spain, Ukraine, Uzbekistan and China. Until now, there are 65 members from 16 countries.

BRCHGA is established to promote scientific research, cultural exchange and effective conservation on cultural heritage and to maintain the precious culturalheritage so that it could be inherited to future generations. The alliance aims to promote the development of cultural undertakings with the innovative research of cultural heritage, promote humanistic and cultural exchange among countries and regions along the Belt and Road, serve scientific conservation, talent cultivation, skill training and effective utilization of international cultural heritage.

IGU-COG：

Commission on Geoheritage (COG) of the International Geographical Union (IGU) focuses on the development of comparative studies on geoheritage, tourism and corresponding social, economic, environmental and political change and concentrated on the communication and transfer of research results in policy relevant terms to policy makers and industry as well as continuing the scientific publishing programme of the Commission. Its official journal International Journal of Geoheritage and Parks was launched in 2013 and is indexed by SCOPUS, DOAJ etc. now. It has 17 years old history and now 14 executive members from 12 countries and Chairperson is Prof.Dongying Wei from Beijing Normal University.