

Look into the future: Talent cultivation for space cooperation

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Talent cultivation for space cooperation

- *With the developing of space technology and applications, talents are increasingly demanded.*
- *Space cooperation provides good opportunity and platform for talent cultivation.*
- *Universities still play important roles in cultivating talents, while alliances and international cooperation programs are serving for talents cultivation by their unique advantages.*

Outline

1

Northwestern Polytechnical University

2

**The Belt and Road
Aerospace Innovation Alliance**

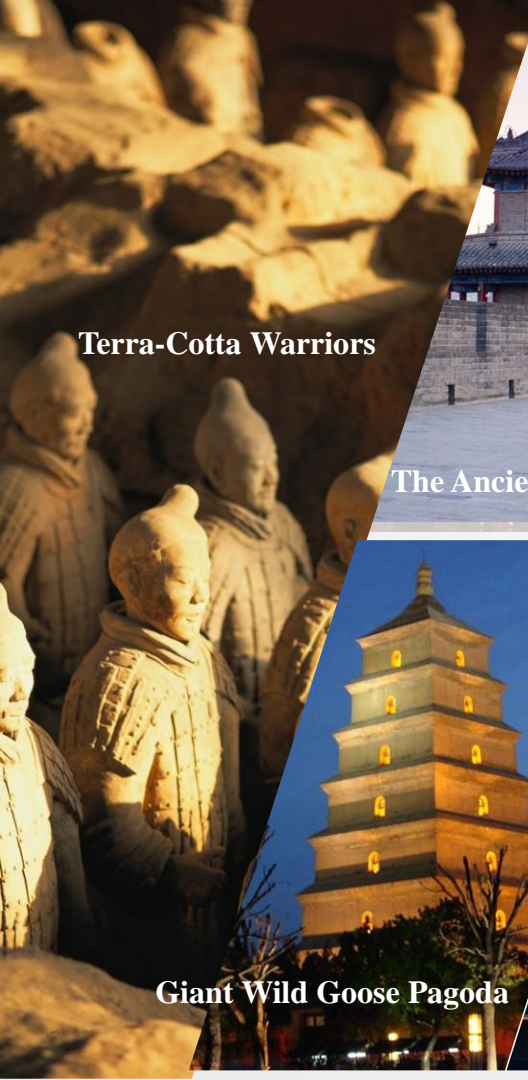
3

“Deep Space Forerunner” Program



Northwestern Polytechnical University

NPU was founded in 1938, now is a research-oriented university exceling in aeronautics, astronautics and marine engineering technology and application



Terra-Cotta Warriors



The Ancient City Wall



The Daming Palace



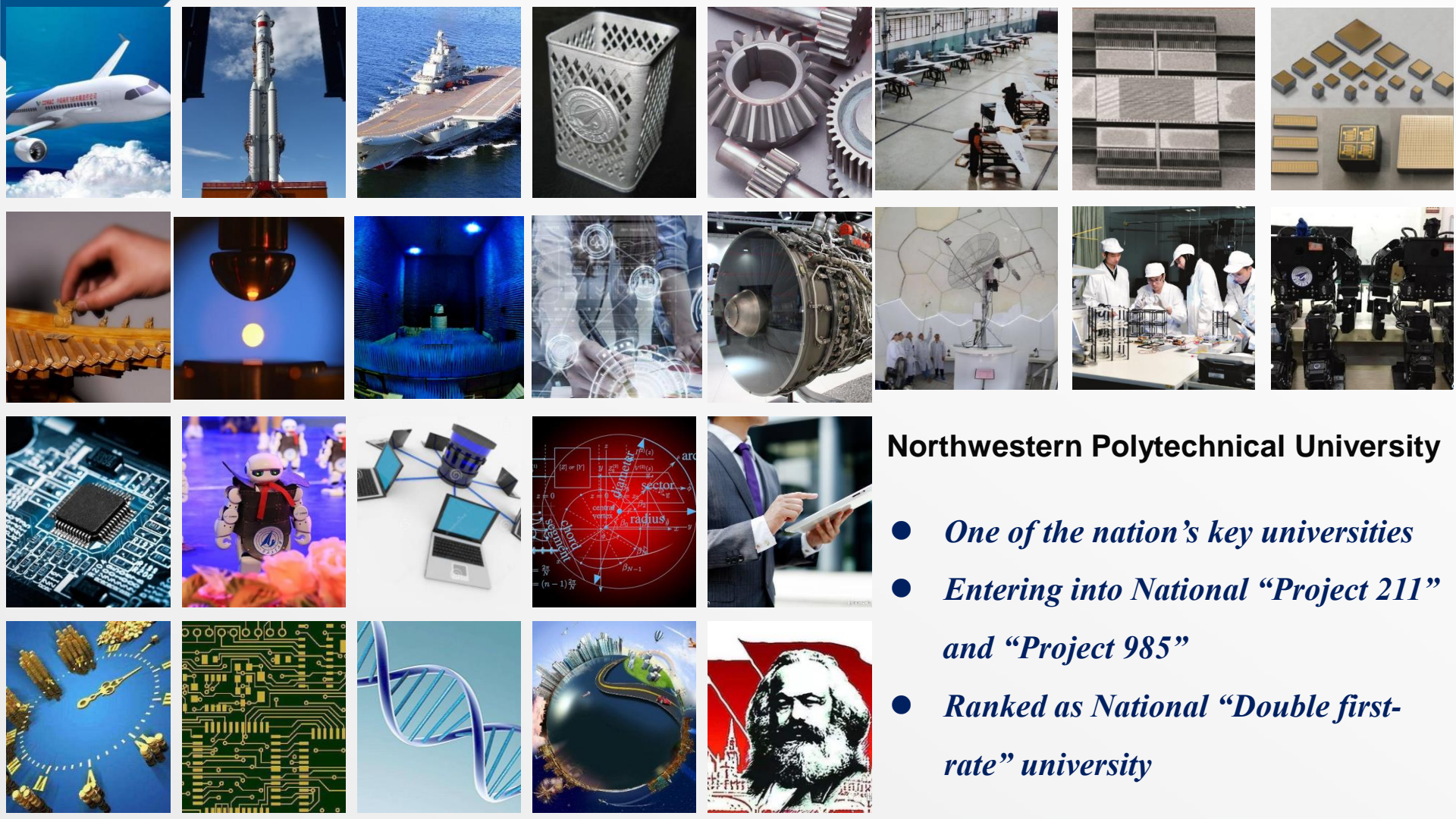
Giant Wild Goose Pagoda



The Bell Tower

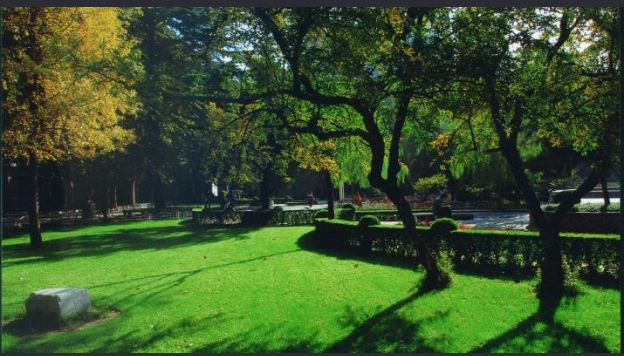
NPU is located in Xi'an.....

- *the starting point of the ancient silk road*
- *modern metropolis*
- *new opportunities under the Belt and Road Initiative*



Northwestern Polytechnical University

- *One of the nation's key universities*
- *Entering into National "Project 211" and "Project 985"*
- *Ranked as National "Double first-rate" university*



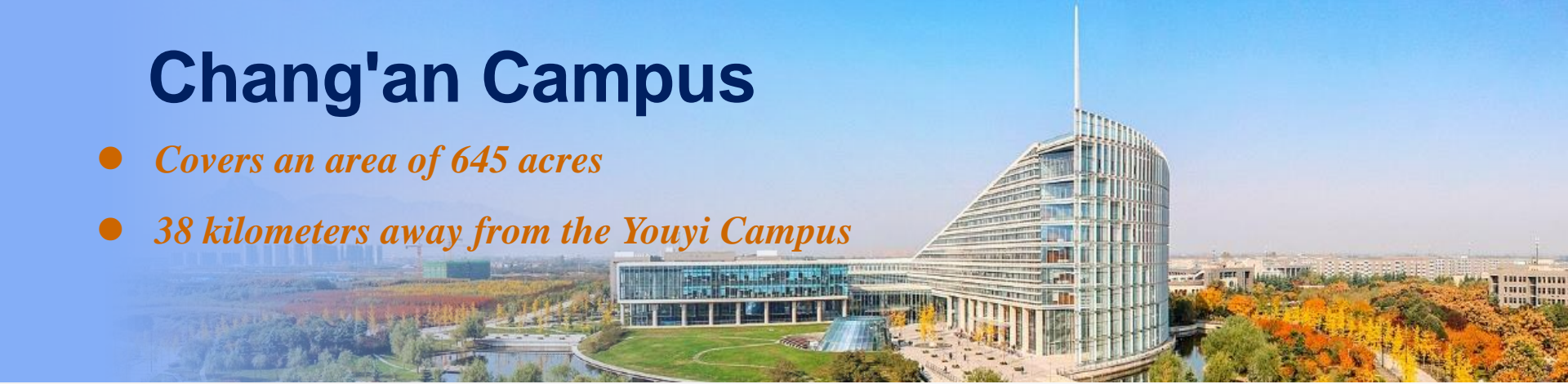
Youyi Campus

- *In downtown Xi'an*
- *Covers an area of 198 acres*



Chang'an Campus

- *Covers an area of 645 acres*
- *38 kilometers away from the Youyi Campus*





Taicang Campus

- *Covers an area of 1780 acres*
- *Close to Shanghai Hongqiao International Airport*



Duke University
 Harvard University
 New Mexico State University
 Northwestern University
 Old Dominion University
 Pennsylvania State University
 State University of New York, Stony
 Texas A-M University
 University of California, Berkeley
 University of California, Irvine
 University of Maryland
 University of Colorado, Denver
 University of Missouri-Columbia
 University of Nebraska-Lincoln
 University of North Carolina
 University of Pennsylvania
 Whitman College
 Yale University

RWTH Aachen University
 Technical University Braunschweig
 Technical University of Berlin
 Technical University of Hamburg-Harburg

France

École Polytechnique de L'université de Nantes
 Institute National des Sciences Appliquées de Lyon
 Université de Poitiers
 Université de Technologie de Belfort-Montbéliard
 Université de Technologie de Compiègne
 Université de Technologie de Troyes
 Université D'evry Val D'essonne
 Université Paris VI
 Université Paris X
 ESCP Business School

University of Vaasa
Belgium
 University of Liege
 Vrije Universiteit Brussel

Italy

Milan Institute of Technology

Sweden

Lund University
 Royal Institute of Technology

Hungary

University of Pécs

The University of Adelaide
 The University of Melbourne
 The University of New South Wales
 University of Sydney

Palestine

Ai Istiqlal University
 Al-Quds Open University
 Engineering Sciences and Technology
 Gulam Ishaq Khan Institute of

Japan

Tokyo University of Science

South Korea

Chung - Ang University
 Hanyang University
 Paichai University
 Sung Kyun Kwan University
 Yeungnam University

Taiwan Region

Chung Cheng University
 Chung Hsing University
 Chung Yuan Christian University
 Feng Chia University
 Fu Jen Catholic University
 I-Shou University
 Kun Shan University
 Providence University
 Shih Hsih University
 Sun Yat-Sen University
 Taiwan Normal University
 Taiwan University
 Taiwan University of Science and Technology
 Taipei University of Technology
 Tamkang University
 Tunghai University
 Yuan Ze University

Canada

University of Alberta
 University of Ryerson
 University of Saskatchewan
 University of Victoria

Britain

Aberystwyth University
 Imperial College London
 Loughborough University
 Queen Mary University of London
 University of East Anglia
 University of Exeter
 University of Glasgow
 University of Hull
 University of Leeds
 University of Leicester
 University of Manchester
 University of Oxford
 University of Sheffield
 University of Southampton
 University of Stirling

Spain

Universidad Politecnica de Madrid
 Universidad Politecnica de Valencia

The Netherlands

Delft University of Technology
 Inholland University of Applied Sciences

Norway

Norwegian University of
 Science and Technology

Denmark

University of Southern Denmark

Russia

Kazakh National Pedagogical University
 Moscow Power Engineering Institute
 Samara State Aerospace University
 State Marine Technical University of St. Petersburg
 State University of Aerospace Technologies

International
Cooperation

More than 250 international partners, including
51 universities among the top 200 universities in
the world.



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**The Belt and Road
Aerospace Innovation Alliance**

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“Deep Space Forerunner” Program

About the Belt and Road Aerospace Innovation Alliance (BRAIA)



The Belt and Road Aerospace Innovation Alliance (BRAIA)

2017.04–2019.04

51 members, from	In total, 11 activities, including
14 countries	5 student activities
15 standing council members	3 academic activities
9 Chinese standing council members	3 managerial meetings
6 non-Chinese standing council members	5 cities
Over 1500 participants	

- *Established on April 23, 2017 in Xi'an*
- *Initiated by Northwestern Polytechnical University (NPU) and Chinese Society of Astronautics (CSA)*
- *NPU, acting as the Permanent Secretariat of BRAIA*

BRAIA Activities

Various BRAIA activities enhance the connection of all BRAIA members and improve its international impact.



BRAIA Academic Activities

BRAIA Young Scholars Workshop

(October 29 to 30, 2017)



- **Participants:** More than 70 young scholars came from BRAIA's members in Algeria, China, Egypt, Italy, Pakistan, Russia, Ukraine, Spain, etc.
- **Topic:** "Young Generation Creates the Future of Aerospace".

BRAIA Academic Activities

The 1st China Microsatellite Symposium (November 18 to 20, 2017)

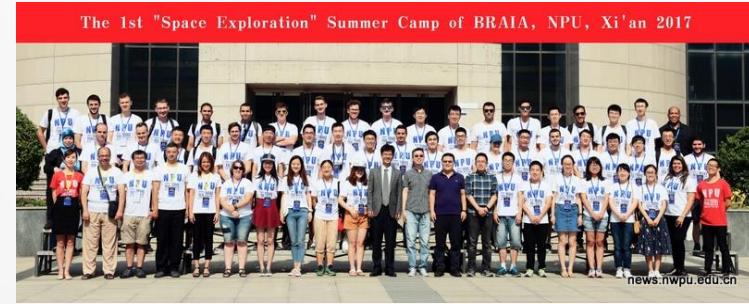


- **Participants:** Nearly 400 experts and scholars from more than 20 countries.
- **Topic:** Micro-satellite technology and related applications.

BRAIA Student Activities

The 1st BRAIA Space Exploration Summer Camp (July 10 to 16, 2017)

- **Participants:** Over 60 students from Algeria, Australia, Belgium, China, Egypt, Russia, Spain and other countries.
- **Topic:** Space science and technology, trainings and contests about small rocket design, cultural experience, etc.



The 2nd Composite Battle World Cup (November 21 to 24, 2017)

- **Host:** The Belt and Road Aerospace Innovation Alliance (BRAIA) and Association of Sino-Russian Technical Universities (ASRTU) .
- **Participants:** 16 teams with more than 150 students, teachers and experts.



BRAIA **Student** Activities

BRAIA 2019 Winter Camp-Light of Egypt (January 21 to 31, 2019)



- **Host:** Military Technical College (MTC) Egypt, member of BRAIA.
- **Participants:** Nearly 100 students from 15 universities of 5 countries.
- **Topic:** Aerospace science and technology, space industry.
- The first BRAIA event took place out of China.

BRAIA Student Activities

2018 The 2nd BRAIA Space Exploration Summer Camp (July 15 to 21, 2018)



- **Participants:** nearly 60 participants from 15 countries.
- **Topic:** aerospace knowledge and applications; history, culture, science, technology, arts of different countries.



2018 The 1st CubeSat and Mission Contest (March 1 to April 23, 2018)



- **Host:** International Astronautical Federation (IAF), Chinese Society of Astronautics (CSA) and Chinese Institute of Command and Control (CICC) and BRAIA.
- **Participants:** from 10 countries, including Australia, Bangladesh, China, Germany, Greece, Indonesia, Israel, Malaysia, South Africa and Sweden.



BRAIA **Managerial** Meetings

2018 BRAIA Council Meeting (October 14 to 15, 2018)

- **Participants:** over 70 delegates from China, Egypt, France, Italy, Pakistan, Russia, Spain and Ukraine.
- **Topic:** working regulations of BRAIA.



2018 BRAIA Working Seminar (May 23 to 25, 2018)

- **Participants:** over 50 delegates from 30 BRAIA member units.
- **Topic:** working mechanism of BRAIA.

BRAIA Plan in 2019

- *A series of BRAIA events are to be (have been) launched in 2019, to strengthen the talent cultivation via cooperation.*
- *BRAIA plans to build regional development centers, expand the international impact and enhance the cooperation further.*
- *BRAIA will set up the Academic Committee, to promote the academic development of all BRAIA members.*



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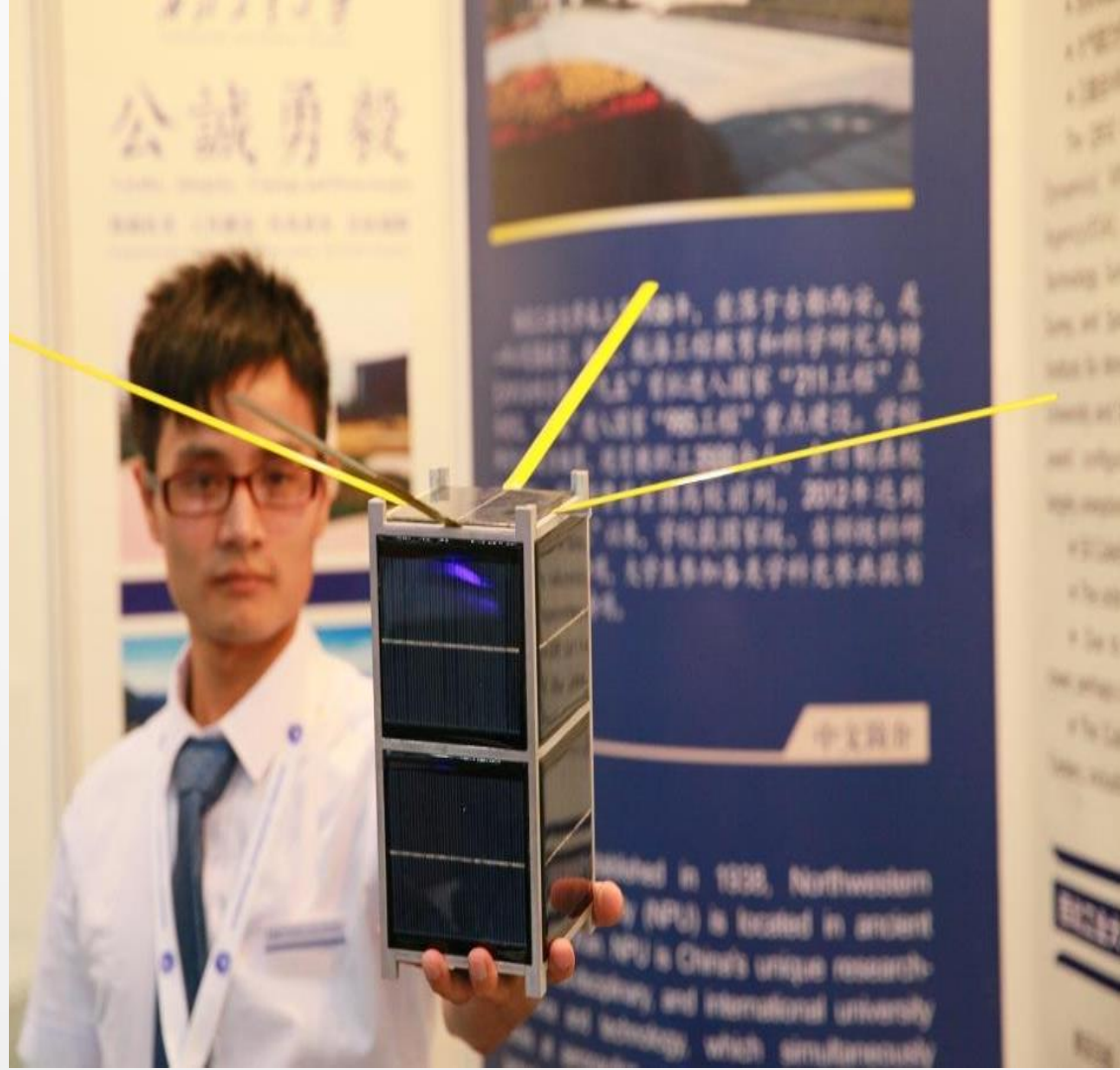
The Belt and Road
Aerospace Innovation Alliance

3

“Deep Space Forerunner” Program

“Deep Space Forerunner” Program

**International CubeSat constellation
for science and research**



Background

1. International educational CubeSat projects

Fly Your Satellite



In 2018, ESA launched the FYS program and had so far supported a total of 20 student CubeSat teams of European universities.

CubeSat Launch Initiative



In 2010, NASA initiated the CubeSat launch Program, which offers free launch opportunities for American universities. Over 100 CubeSats had been selected.

Background

QB50 Project



In 2011, EU began the QB50 International Cooperative Science Program, launched 38 CubeSats for lower thermosphere atmosphere research, verifying new space technology, and space education purpose.

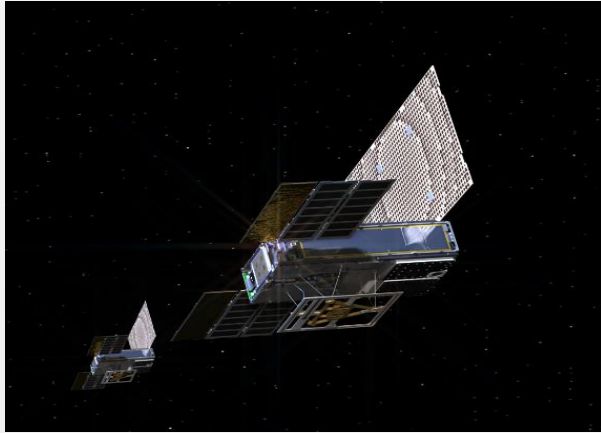
Birds Project



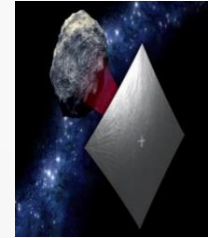
In 2016, JAXA began the Joint Global Multi-Nation Birds Satellite project that helps Ghana, Mongolia, Nigeria, and Bangladesh to develop their CubeSats.

Background

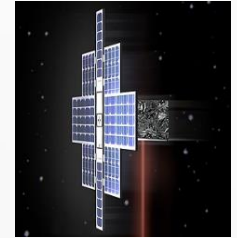
2. Deep space CubeSat, a new frontier



Biosentinel



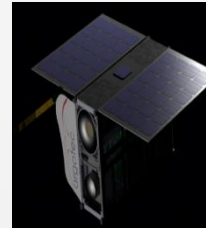
NEAScout



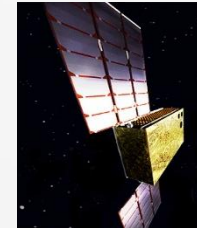
Lunar Flashlight

More deep space CubeSats are on the way!

In 2018, MarCO CubeSats began their journey to Mars.



ArgoMoon



EQUULEUS



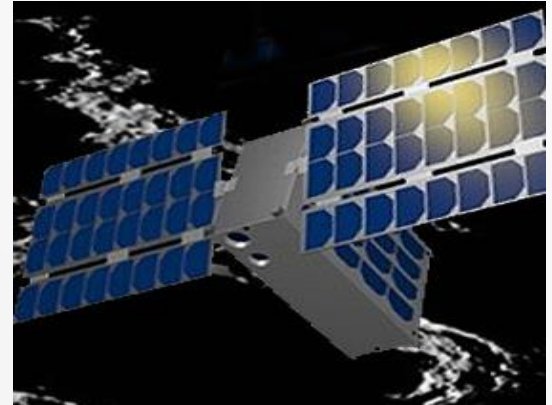
Lunar IceCube

Deep Space CubeSat Forerunner Project

-- Introduction

An International Deep Space CubeSat mission initiated by CNSA

- ✓ *10-20 CubeSats form a constellation for real science mission*
- ✓ *All CubeSats contributed by universities and institutes worldwide*
- ✓ *The destination of the CubeSats will be deep space!*



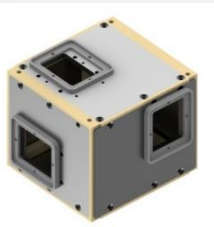
Deep Space CubeSat Forerunner Project

-- Specification

CubeSat and Deployers < 300kg

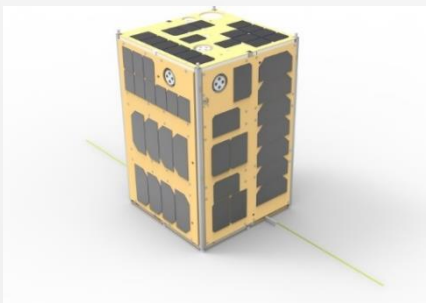
- ✓ *Innovative payloads*
- ✓ *1~2U, mass 1.5~3kg*

Payload



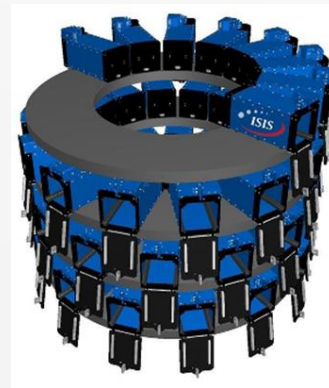
Satellite

- ✓ *6U~12U CubeSat*
- ✓ *Mass ≤ 15kg*



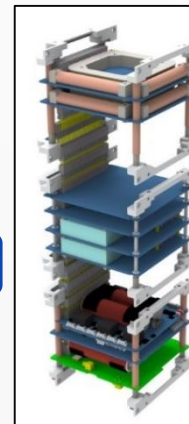
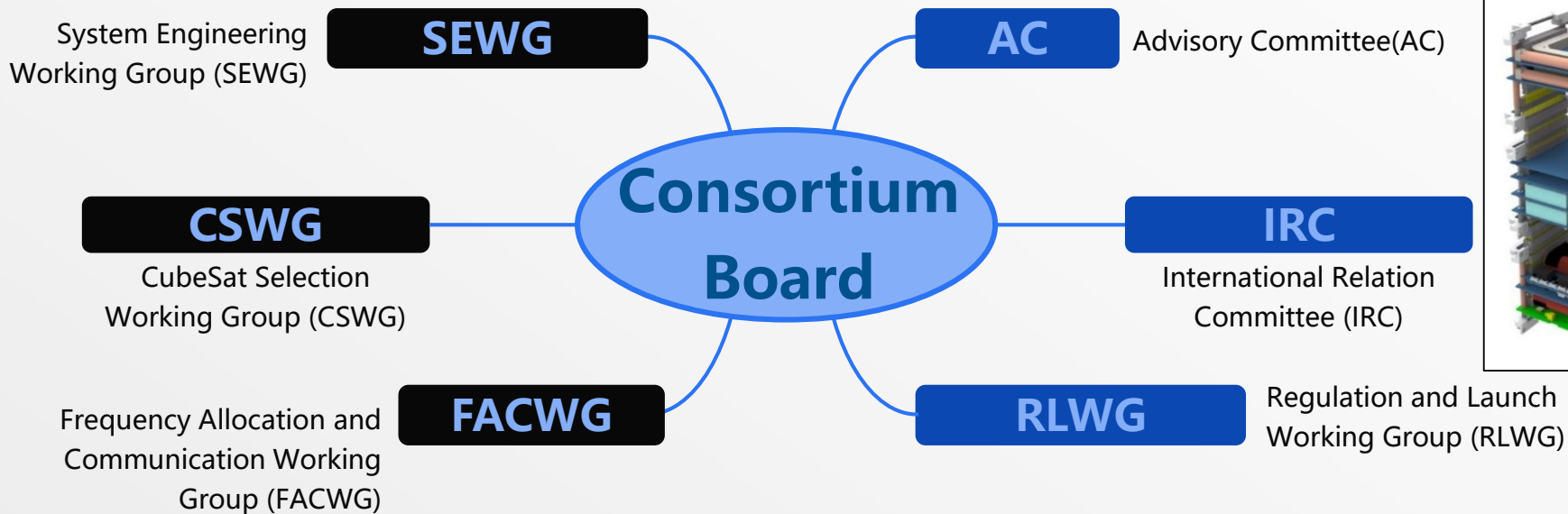
- ✓ *Cluster Deployer*
- ✓ *Light weight*

Deployer



Deep Space CubeSat Forerunner Project

-- Administration

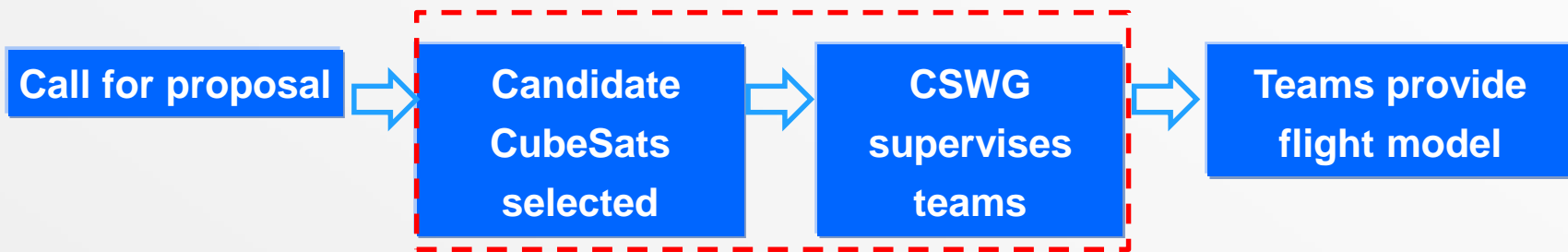


The working groups consist of international expert, who will meet twice per year.

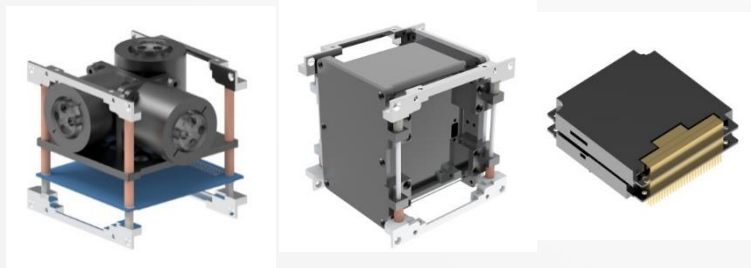
Deep Space CubeSat Forerunner Project

-- CubeSats selection

Development



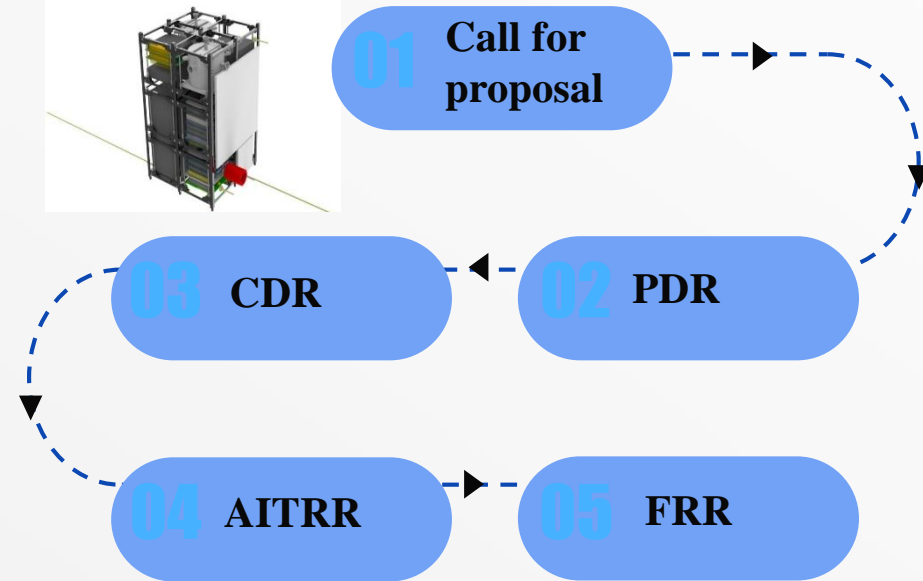
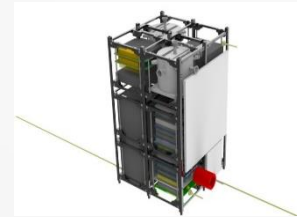
The call for proposal is open to the world. The selection of the final team is decided by CSWG.



Deep Space CubeSat Forerunner Project

-- Review

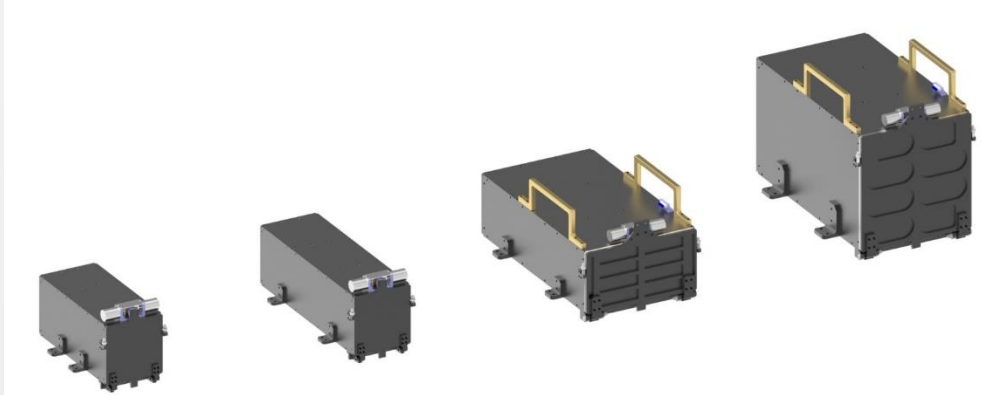
- **Milestones:** *Call for proposal, Preliminary Design Review, Critical Design review, Assembly, Integration, Test Readiness Review and Flight Readiness Review.*
- **Review:** *remote assessment and on-site inspection.*



Deep Space CubeSat Forerunner Project

-- Launcher and Deployers

- *All the selected CubeSats will be launched for free.*
- *The launcher will be Chinese Long March series.*



Deep Space CubeSat Forerunner Project

-- Education and training

- *Funding for the teams from developing countries*
- *Free training, internship 4~8weeks /year*
- *Additional three month training for developing countries*
- *Free environment test for developing countries*





Thank You!

