



# Space Science — Devise a Creative CubeSat

## About the Challenge

### ·Requirements

Focusing on how the CubeSats can undergird the thriving development of human society and bring convenience to our everyday life, contestants are required to read through the Activity Guide and take a deep dive into the potential real-world applications of CubeSats, such as to tackle environmental issues (including but not limited to vegetation mutation, air pollution, glacier melting, etc.), social issues (including but not limited to post-disaster reconstruction, the impact of the COVID-19 pandemic, etc.) and economic development issues (including but not limited to urban development, rural development, urban-rural differences, etc.) that are of major concern to the international community.

With the goal of addressing these pivotal issues, contestants must use everyday materials available around them to devise a CubeSat model with both appropriate functions and appealing look in accordance with the requirements set forth in the Activity Guide. In the meantime, contestants shall take engineering notes to record the entire processes and make a video to present the finished work.

Specific task requirements:

#### (1) Requirements for the engineering notes:

Length: any words.

Elements:

The engineering notes should contain the following elements:

·Name of work: The name of work should be reflective of the function and type of CubeSat, such as "CubeSat solution for communication in unmanned areas of the Nafud Desert", or "Remote-sensing CubeSat solution for monitoring the changes of Arctic glaciers".

·Functional description: To clearly describe the application scenarios and functions of the CubeSat designed.

·Design drawing: It is suggested that contestants present the exterior of the CubeSat in the form of a three-view drawing, and add words to describe important parts if necessary.

·Structural design: Contestants should clearly depict the structures of the CubeSat model through pictures and explanatory notes. The structure drawing can be hand-drawn or computer-drawn.

·Materials used: Contestants should make a list of materials used to build the CubeSat model.

·Building processes: Contestants may record the entire building processes by words or the combination of pictures and words.

·Key technologies: Please describe in the engineering notes whether the work uses



some key technologies.

File format: PDF

## (2) Requirements for the video

Length: no more than 10 minutes

Format: AVI, MOV, or MP4

Size: no more than 500 Mb

Elements: The video should include six parts: self-introduction or team introduction; process of theme research; process of work design; process of work building; structures and functions of the finished work; self-summary.

Quality: The video shall be clear. The soundtrack, subtitles and footage should be kept in sync with no obvious noise. The voiceover shall be in English and have good sound quality. There shall be no errors in the subtitles.

## •Deadline

Contestants must complete and submit their works before the submission deadline.

## •Task

- (1) Engage in the learning activities specified in the Activity Guide;
- (2) Learn about the real-world applications of CubeSats across the globe;
- (3) Work out a creative design according to the results of thematic research and learning;
- (4) On the basis of the design, use everyday materials to build a physical CubeSat model and record the entire processes;
- (5) Take engineering notes that clearly describe the whole processes and the result of work building;
- (6) Make a video that includes four parts: research stage, design stage, work building stage, and work display and presentation (contestants must present their works in fluent, well-organized and articulate words).

## •Materials

Requirements for the materials used:

1. Contestants can use materials available around in everyday life, and are encouraged to use environment-friendly materials that can be recycled and reused. They can also use self-made devices that meet the relevant laws and safety regulations.
2. Contestants are allowed to use low-voltage electronic equipment not greater than 12V.



3. Contestants are prohibited from using materials containing radioactive substances, pollution-causing and unstable chemicals, high-power electrical appliances, or other dangerous materials that may cause personal injury.
4. Contestants must safely handle the works they have built under the guidance of their instructors, and must not perform dangerous operations at will. Contestants shall also use tools (such as sharp knives, etc.) under the guidance of the instructor.
5. The panel of judges has the right to decide whether or not to disqualify the contestants according to the seriousness of the safety issues associated with their works.
6. Contestants are required to carefully read through this guidebook before preparing for the preselection and devising and building their works.

## ·Submissions

Please submit your work through our official website (2021.brmakercamp.cyscc.org.cn). Submission required for this task include:

- (1) Engineering notes recording the whole processes of CubeSat building;
- (2) A video presenting the finished work.

## ·Scoring Criteria

<b>Building Dreams in Talented Adolescents and Fostering Collaboration for Space Silk Road</b>	
<b>Scoring Form for the Preselection Activity of the Belt and Road Teenager Space Maker Camp</b>	
<b>Compliance with Requirements (5 points for each item, 15 points in total)</b>	Score
Name of the work, including engineering notes and video (see Section 4.2 of Activity Guide for details).	5
The engineering notes are clearly structured and contain the 6 key elements (see Section 4.2.1 of Activity Guide for details).	5
The video format is AVI, MOV or MP4, with length and size not exceeding 10 minutes and 500 Mb respectively (see Section 4.2.2 of Activity Guide for details).	5
<b>Design skills (5 points for each item, 10 points in total)</b>	Score
The design is able to meet users' needs, solve social problems or provide opportunities, and the solution is clearly articulated.	5



The work has an appealing look and is reflective of the design skills and aesthetic taste of the contestant.	5
<b>Creative thinking (5 points for each item, 15 points in total)</b>	Score
The work represents a unique and novel solution, and there is no other work or product to rival its unique creativity.	5
The work provides a new and meaningful improvement for achieving a specific purpose.	5
The work is closely linked to the main theme of this competition, and its purpose and target users are well-defined. Information related to the selected theme can be collected from multiple sources.	5
<b>Engineering notes writing (see Section 4.2.2 of Activity Guide for details) (5 points for each item, 30 points in total)</b>	Score
The design includes the name of the work and the functional description. The name of work is reflective of the function and type of CubeSat, such as "CubeSat solution for communication in unmanned areas of the Nafud Desert, or "Remote-sensing CubeSat solution for monitoring the changes of Arctic glaciers". The functional description can clearly describe the application scenarios and functions of the CubeSat designed.	5
Design drawing: the exterior of the CubeSat is presented in the form of a three-view drawing, and necessary words are added to describe important parts.	5
Structural design: the internal and external structure of CubeSat are clearly depicted through pictures and explanatory notes (the structure drawing can be hand-drawn or computer-drawn).	5
Materials used: there is a list of materials used to make the CubeSat model.	5
Building processes: the contestant has recorded the entire building processes in the form of words or the combination of pictures and words.	5
Key technologies: the contestant has described in the engineering notes whether the work uses some key technologies.	5
<b>Hands-on skills (5 points for each item, 15 points in total)</b>	Score
The appearance of the CubeSat model complies with the dimensional requirements.	5
When building the model, the contestant has selected suitable materials to make the various parts of the CubeSat.	5



The CubeSat model looks delicate and , and is reflective of the meticulous handling of details.	5
<b>Presentation skills (5 points for each item, 15 points in total)</b>	Score
In the submitted video, the contestant can display the work in a comprehensive and accurate manner.	5
The contestant is able to showcase the whole problem-solving process, which must be closely linked to the final design.	5
In the submitted video, the contestant can display the work in fluent, well-organized and articulate words.	5
Total Score	100
Works that feature program-controlled electronic components will get 10 bonus points if the desired functions are successfully realized.	10