

Space Capacity Building for A Sustainable World

How can University Space Engineering Consortium
(UNISEC) contribute to it?

Shinichi Nakasuka
The University of Tokyo

Is the world sustainable for human beings?

- **Global problems on the Earth**

- Global Warming
- Wildfire
- Deforestation
- Desertification
- Flood and Drought
- Earthquake
- Tsunami
- Volcano explosion, etc.

- The situation seems to be **getting worse?**



UNISEC-Global Community

- 23 Local Chapters, 57 points of contact
- Welcome New Local Chapters (acknowledgement later today)
 - UNISEC-Kazakhstan and UNISEC-Colombia
- Vision 2030-All *"By the end of 2030, let's create a world where university students can participate in practical space projects in all countries/regions."*
- Question: What can we do when we achieve the goal in 2030?

How can UNISEC contribute to solving the global problems?

- “Global problems on the Earth” and “Dynamics of the Earth” which may be the basis of such problems can be monitored by nano-satellite constellation operated by many countries
- Various data will be shared among those who need them
 - Global Warming, Wildfire, Deforestation, Flood, Earthquake, Tsunami, etc.
- Merits of Universities as developers for those satellites:
 - Universities can work for **even “non-profit” satellites**
 - Universities have fresh students every year who want to **train themselves by developing satellites**
 - UNISEC universities can **continue monitoring the problems for 10 years or so** if we decide. (people may change, universities remain)

What are needed for successful constellation mission

Issues to be considered

- Congruent systems in satellite design, fabrication, and operation
- Reliable data
- Analysis methods
- Support from general public
- Finance
- Legal matter
- Clear purpose and goal
- Strategy

People

- Capable engineers
- Committed scientists
- PR specialist
- Finance expert
- Legal staff
- Designer
- Anybody who wants to make it successful
- Passion and Guts



Education would be indispensable !

Pre-8th Mission Idea Contest (PreMIC8)

Missions by multiple nano-satellites

Let's think about good constellation and FF mission!

- MIC8 will be held in 2023.
- In 2022, we encourage to organize regional competitions.
- Pre-MIC8 workshop will be held in Istanbul (or virtually) on October 19, 2022.
 - Abstract submission: July 25, 2022
 - Notification: August 31, 2022
- The requirements include:
 - the mission is carried out by multiple satellites made of **6U CubeSat or smaller.**
 - The number of satellites can be arbitrary as long as it is larger than one, and the mission has clear benefits of having multiple satellites in orbit at the same time.

Rationale of the Vision 2030-All

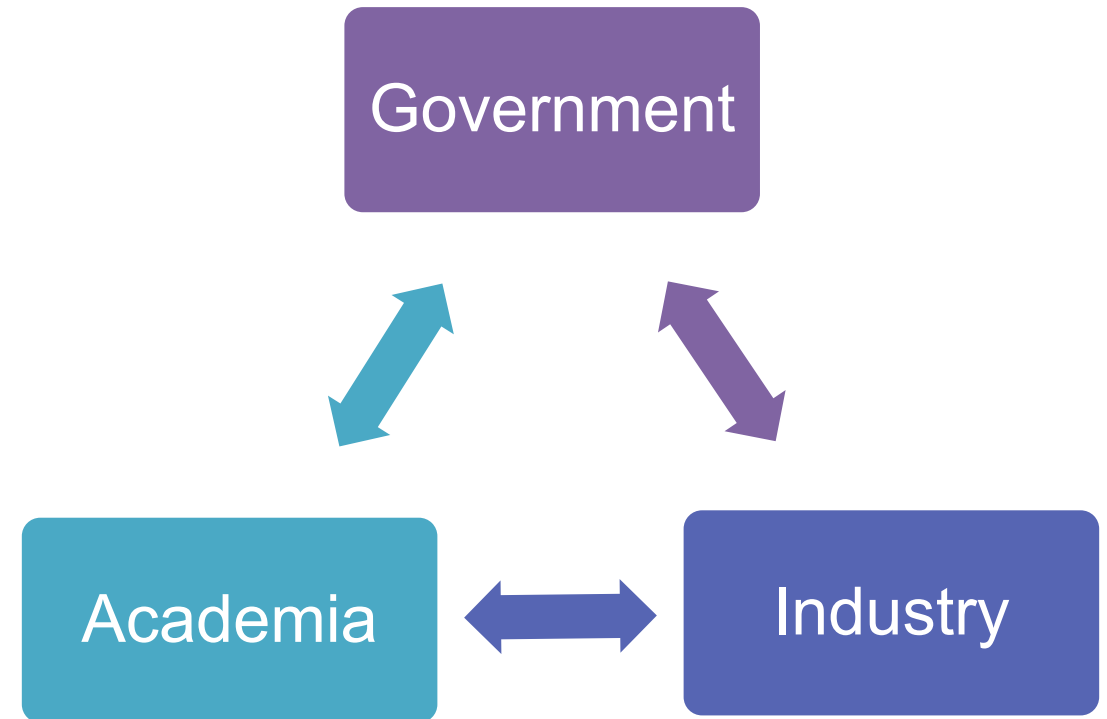
- Every country/region needs **experts in space fields** who can guide, at least, what kind of space related components or COTS parts can be used for space systems, and how to develop systems which can work in space environment
- Key principle of the 2030 Agenda for Sustainable Development (UN)
No one will be left behind.
- Gaps between spacefaring countries and non-spacefaring countries can be reduced in the field of **human resource development** relatively easily, if spacefaring countries support (such as in the framework of UNISEC-GLOBAL).

How to sustain and step-up space programs/projects

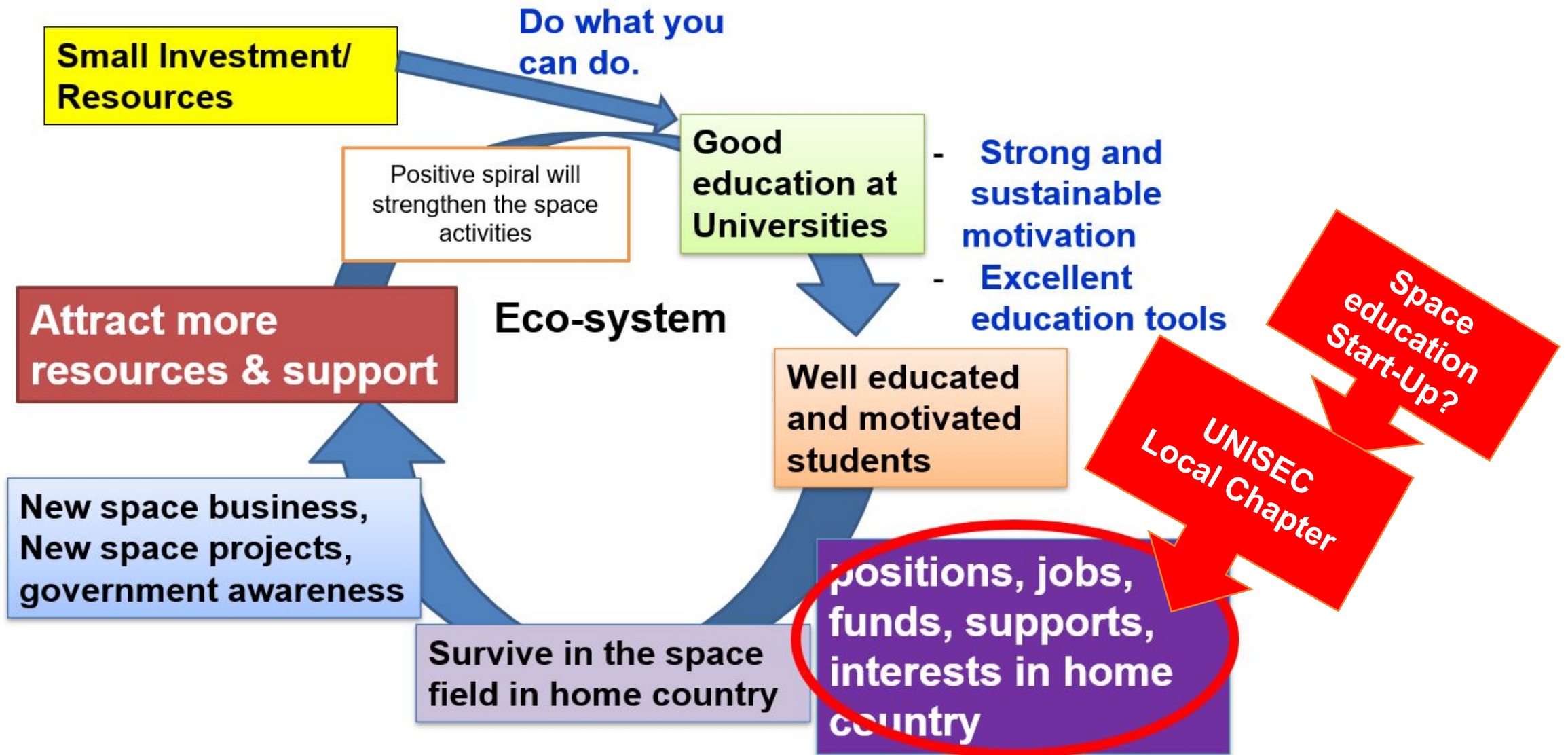
- Your local chapter can be **a center of training** in your region and **a member of global constellation** mission
 - Joining the training program – Easy
 - CLTP, HEPTA-Sat, CanSat, etc
 - Launching the first CubeSat – Not difficult
 - BIRDS project, KiboCUBE, J-CUBE, etc
 - **More complicated mission – Joining constellation mission?**
 - How? What? Who? How much? Why?
 - Is it worth your efforts?
- Activities (education, training) should be carefully designed from the beginning so that **they can continue for a long term.**

Who should pay for your local chapter activities?

- **Government funding**
 - Working with Space Agency
 - Higher Education for Science and technology
- **Support from industry**
 - Corporate Social Responsibility
 - Collaborative research
- **Academia related funds**
 - Fund Raising as UNISEC Local Chapter
 - Provide professional training



Eco-system Model of University Space activities



Let's make it happen together!
From zero to one, then, step by step!