

UNISEC-Global Challenge - for Sustainable University Space Activities

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UNISEC-Global

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United Nation Committee on the Peaceful Uses of Outer Space (UNCOPUOS)

Outline

- UNISEC-Global “VISION 2030-ALL”
- UNISEC-Global Approach
- CanSat Activities
 - CLTP
 - ARLISS
 - New educational tools –HEPTA-Sat
- Eco-system model for University Space Project/program
- Conclusion
- Upcoming Events in 2019

Vision 2030-ALL

*“By the end of 20**30**,
let’s create a world where
university students can
participate in practical
space projects in **all** countries.”*

Key principle of the 2030 Agenda for
Sustainable Development :

No one will be left behind.

17 Local Chapters, 50 Points of Contact

UNISEC-Global's Approach

Training Program

HEPTA-Sat Training

CanSat Leader Training Program

Forum, Conferences, Technical competitions

UNISEC-Global Meeting, Mission
Idea Contest, Nano-satellite
Symposium, CanSat Competition

Vision 2030-ALL

Debris Awareness and Solutions

Debris Mitigation Competition

IAA Study Report: A Handbook for
Post-Mission Disposal of Satellites
less than 100kg

Support Global Space Projects initiated by member universities

CanSat Leader Training Program (CLTP)

Objective: CLTP is a training program for professors/instructors to learn how to conduct CanSat (or HEEPTA-Sat) training by experience. Participants are expected to teach their students after training. It has contributed to capacity building in basic space engineering and technology.

Launched: October 2010 (1st CLTP was held in 2011)

Offered: Annually

Graduated: 81 participants from 37 countries

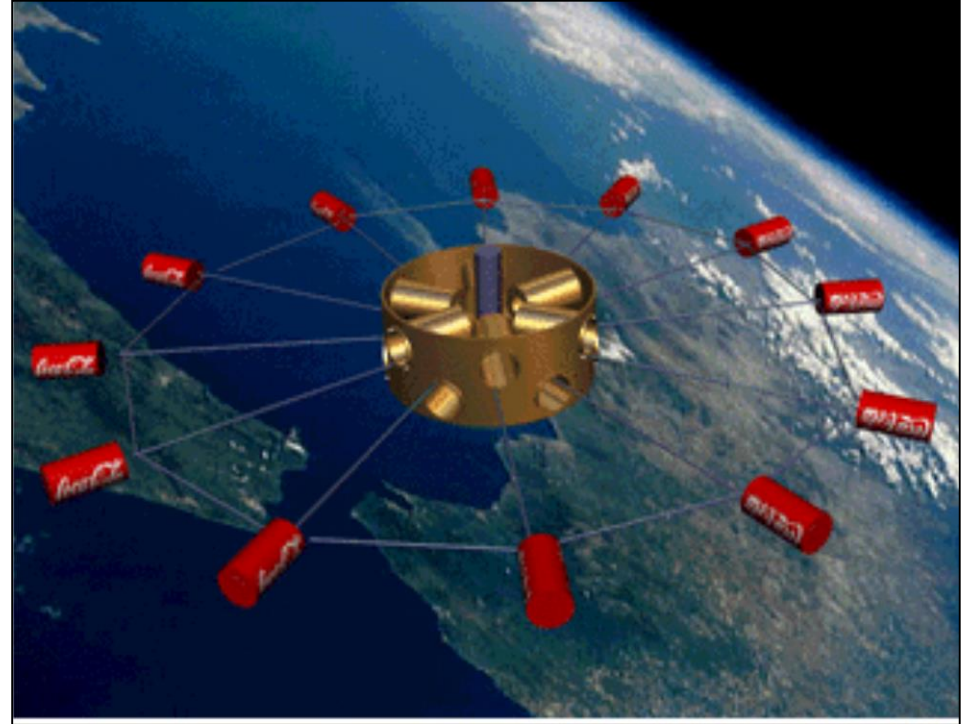


CLTP10 will be held in August 19-30, at Nihon University, Japan.

UNISEC - CanSat Training /Competition in 2019

Event	Date	Venue	Participant	
CanSat Training Program	Feb3-5	Cairo, Egypt	30	Domestic
Tanegashima Rocket Contest (incl.CanSat)	March6-9	Kagoshima, Japan	315	Domestic
Training on Construction and launching of Cansats	May17- June20	Luanda, Angola	87	Domestic
Thailand CANSAT-Rocket Competition 2019	July	Thailand	200- 300	Domestic
CanSat in Noshiro Space Event	Aug15-17	Akita, Japan	300	Domestic
21 st ARLISS	Sep9-12	Nevada, USA	200	International
CanSat Short Course	Sep23-28	Bekaa, Lebanon	96	Domestic
1 st CRIC 2019	Oct 4-6	Serbia	200	International
5th national CANSAT contest (Mexico)	Oct10-11	Tijuana, B.C. Mexico	150	Domestic
CanSat workshop	Oct	Córdoba Argentina	30	Domestic
CanSat Training	Nov8-10	Istanbul, Turkey	100	Domestic

Birth of CanSat at USSS 1998



Initial Concept: launch all the CanSats and operate them in next USSS (one year later)

“Let’s make a satellite out of this Coke-can !!”

Prof. Bob Twigg, Stanford University

ARLISS 1999-2018

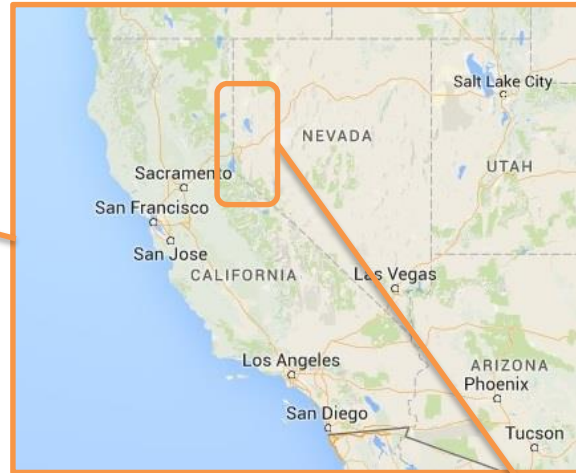
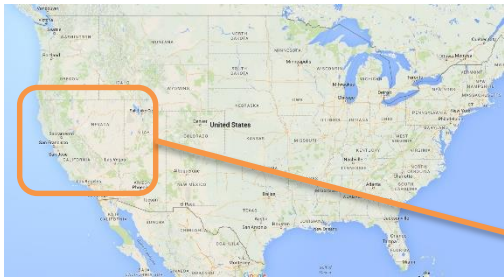
A Rocket launch for International Student Satellites

A CanSat launch event at BlackRock desert, NV, US

- organized by AEROPAC (An amateur rocket group in US) and UNISEC
- 1 stage solid motor to 4,000m
- Three 350ml sized cans or one large can (<H240mm, dia.140mm)
- Cost \$400 /flight

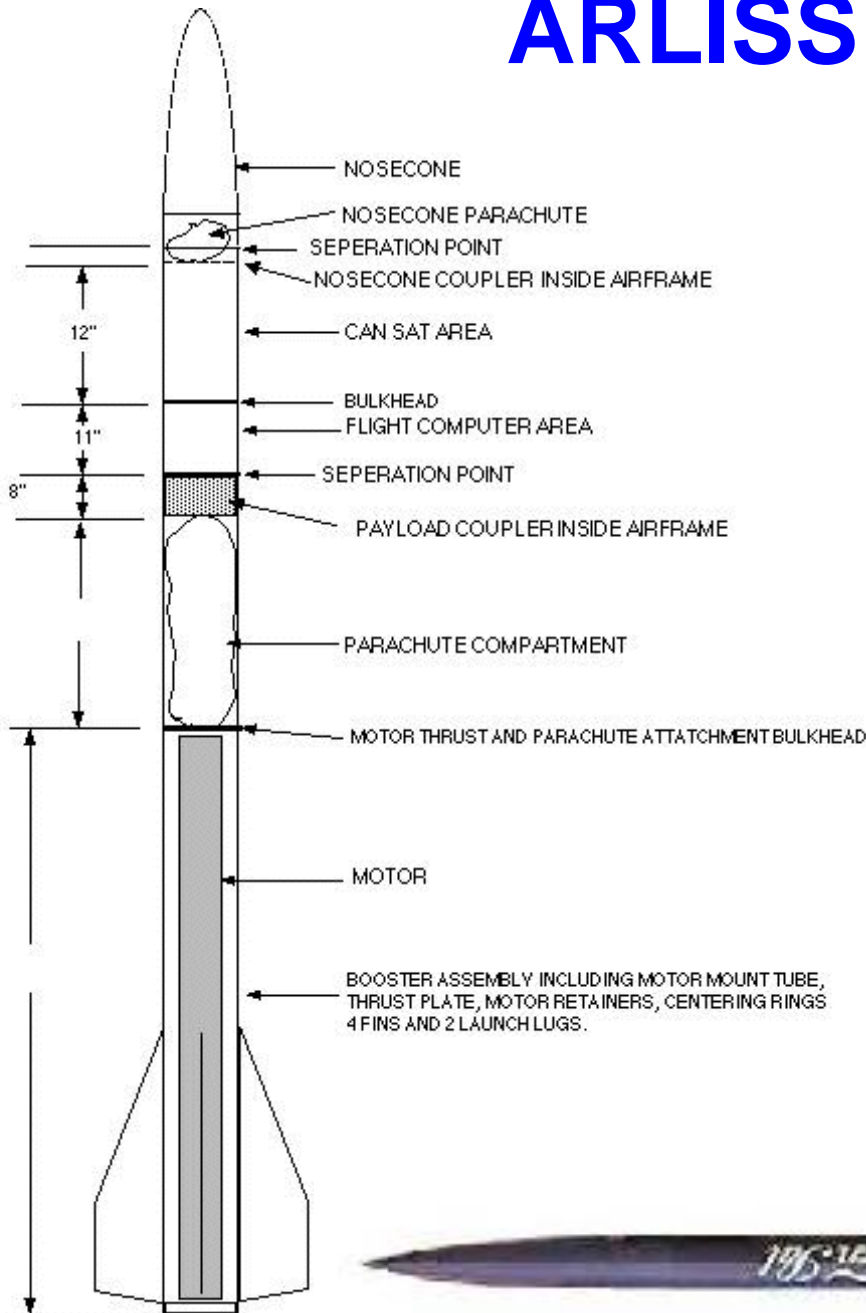


Black Rock Desert



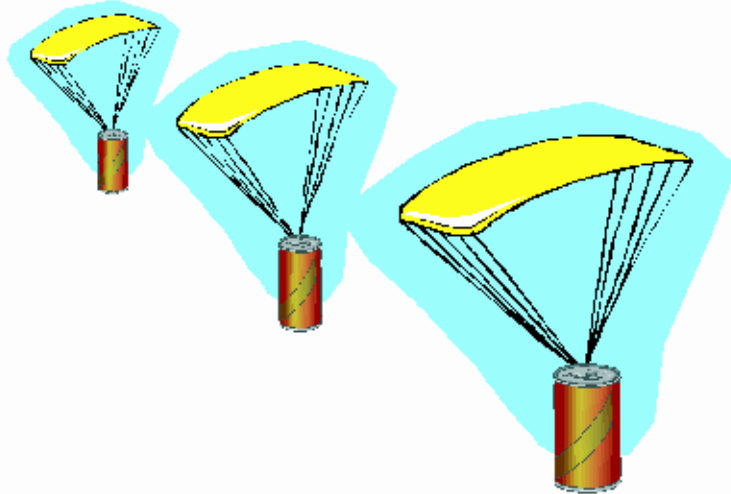
ARLISS Rocket

- AEROPAC Amateur Rocket group
- 1 stage solid motor
- Lift 1.8 kg to **4 km**
- Three 350ml sized cans or one “Large sized can”
- Black Rock Desert (Nevada, USA)



2001 ~ Comeback Competition

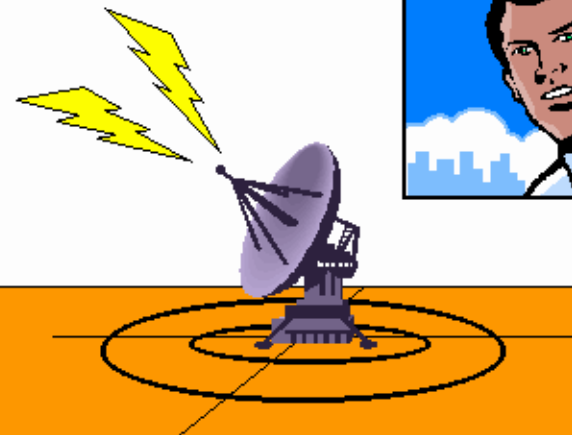
Competition



**Call Back Your
CANSAT!!**



ARLISS2001 PROJECT



CanSat evolution – various types



“Paraglider” type

“Plane” type

“Rover” type

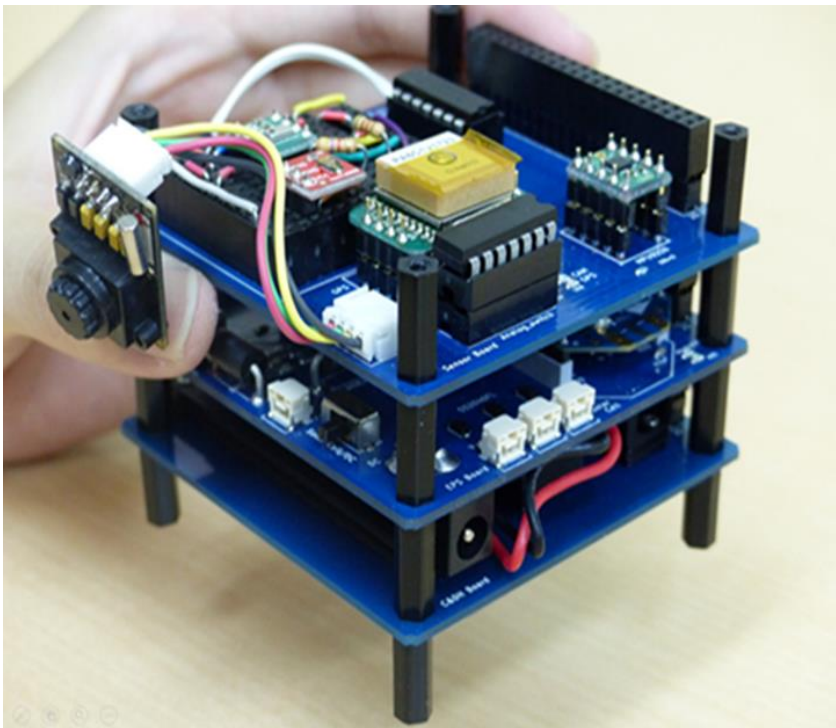
Educational Significances of CanSat/Micro/Nano/Pico-Satellite Projects

- ***Practical Training of Whole Cycle of Space Project***
 - Mission conceptualization, satellite design, fabrication, ground test, modification, launch and operation
 - Know what is important and what is not.
- ***Importance for Engineering Education***
 - Synthesis (not Analysis) of a really working system
 - Feedbacks from the real world to evaluate design, test, etc.
 - Learning from failures (while project cost is small)
- ***Education of Project Management***
 - Four Managements: “*Time, human resource, cost and risk*”
 - Team work, conflict resolution, discussion, documentation
 - International cooperation, negotiation, mutual understanding
- ***Also contributions to other technology areas !***

Significance of CanSat Program

- **Very Short Period Required for One Whole Project**
 - *5-6 months for mission conceptualization, satellite design, fabrication, ground test, modification, launch, operation*
 - *Launch date is fixed in ARLISS: no delay is allowed*
- **Very Low Life Cycle Cost for One Project**
 - *\$500 - 1,000 budget for one team (typically)*
 - *Rocket launch requires \$400/flight, etc.*
- **Small, but Still Can be “a Satellite”**
 - *All the satellite functions + mission can be packed*
- **Can be Retrieved after Experiment**
 - *Analysis of the causes of failures is easy*
- **No worries of debris**

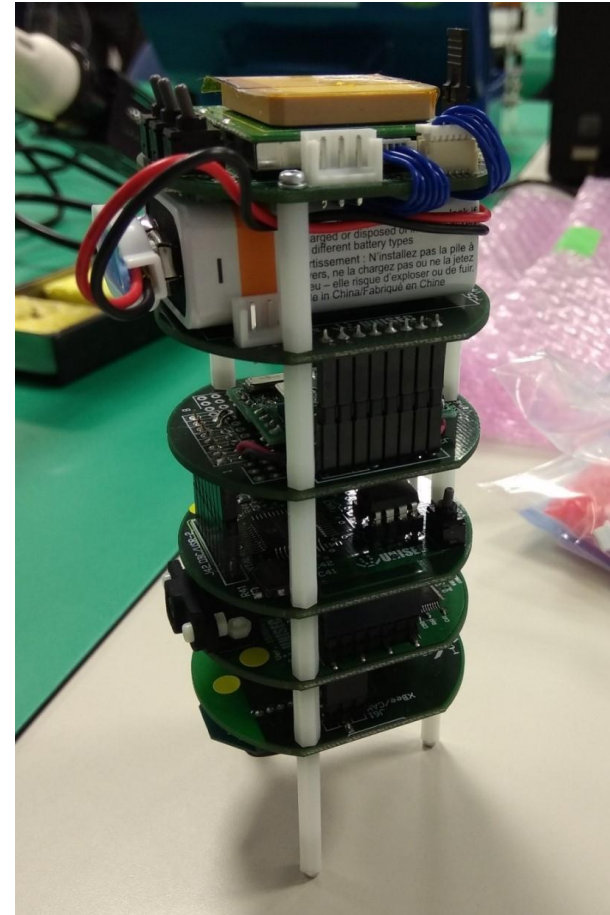
Training Programs: Educational Kits



HEPTA-Sat

(CLTP8-, HEPTA-Sat Training Workshops)

Developed by: UNISEC-Japan



i-CanSat

(CLTP3-7, CTP)

New Tool: HEPTA-Sat

International Knowledge and Technology Transfer for CubeSat Development



(Hands-on Education Program for Technical Advancement)



Southern Hemisphere Space Studies Program 2019
Collaboration with International Space University(ISU)

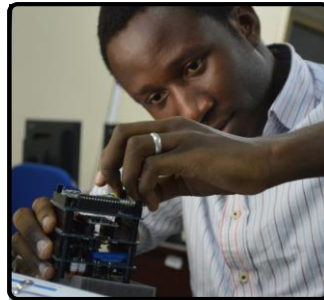
What is HEPTA-Sat Training Program ?

- 1) Understanding basic satellite system architecture.
- 2) Experiencing the pico-satellite development process in a short time.
- 3) Acquiring the basic knowledge of space engineering.

Step 1: Lecture



Step 2: Hardware Assembly



Step 5: Field test



Congratulations!



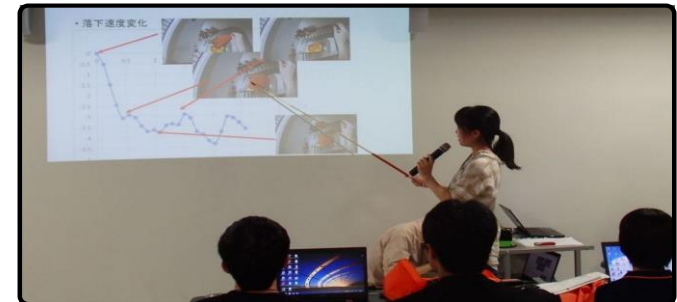
Step 3: Hardware & Software Integration



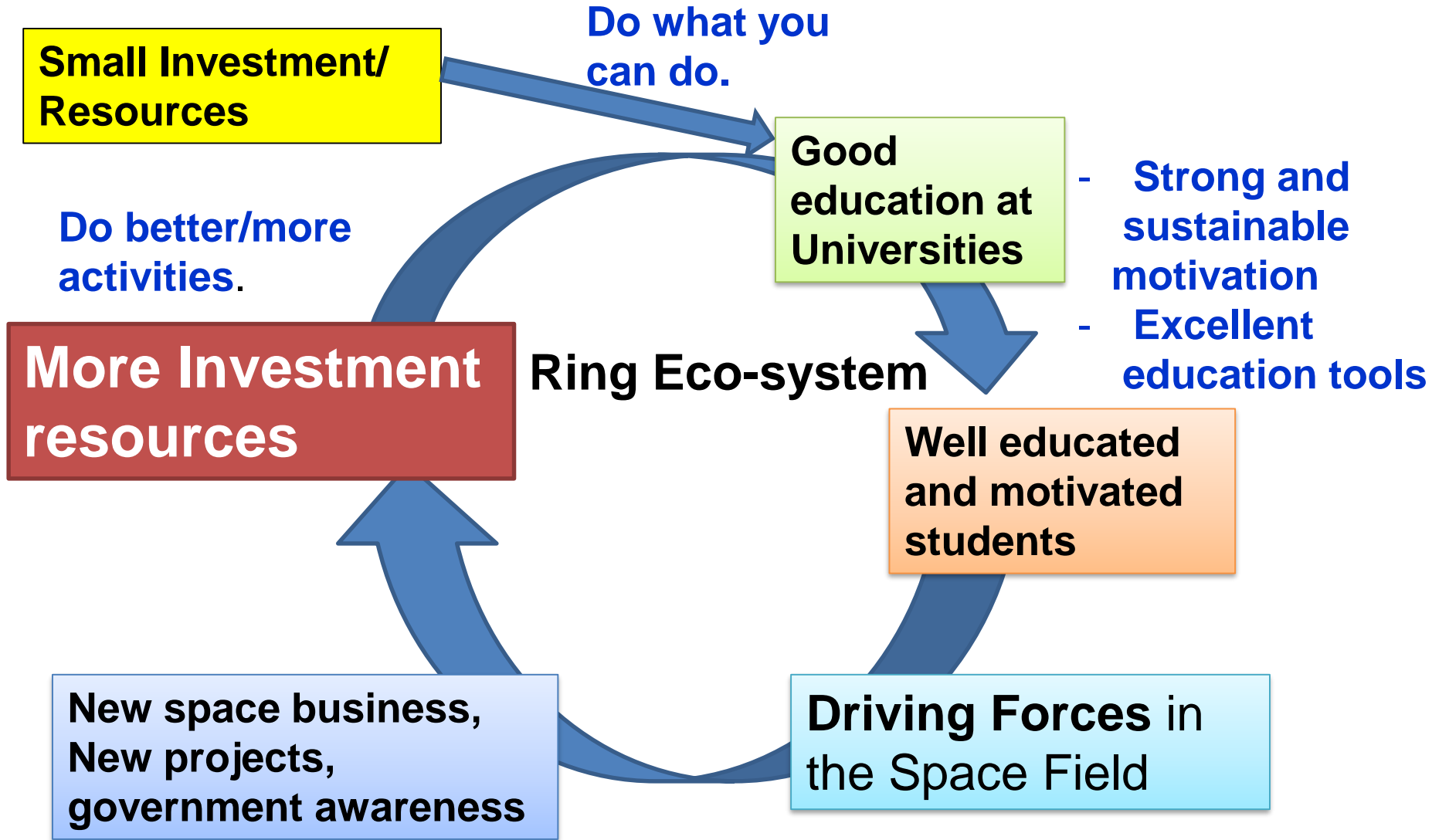
Step 4: Mission Design



Step 6: Review & Presentation



Eco-system Model of University Space Projects/Program



Conclusion

- UNISEC-Global aims to realize a world where university students can participate in practical space projects in all countries.
- Building an eco-system of space education would be beneficial to academy, industry and government
- Initial small investment/resources will trigger “Ring Eco-system.”
- Strong and sustainable motivation will drive this Ring Eco-system continually to grow larger and better.
- Excellent space education tools are essential to keep such strong motivation. CanSat/ARLISS and Hepta-sat organized by UNISEC-GLOBAL can make such contributions.
- Again, initial small investment is key to trigger the movement

Upcoming Events in 2019

- **10th CanSat Leader Training Program (CLTP10)**
(August 19-30, 2019), Nihon University, Chiba, Japan.
- **21st ARLISS** (Sep 9-12), Black Rock Desert, Nevada, USA
- **7th UNISEC-Global Meeting** (Nov 30-Dec 3, 2019),
The University of Tokyo, Tokyo, Japan
- **6th Mission Idea Contest** (Dec 2) **Abstract Due : August 8**
 - For Archiving Sustainable Development with Human Spaceflight

Associated Event

HEPTA-Sat Training Short Course (Dec 4-5, 2019) Tokyo

Lean Satellite Workshop (Dec 4-5, 2019) Tokyo

Global Space Job Fair in Tokyo (Dec 6, 2019) Tokyo

Thank you!



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