Introduction of J-Cube

Introducing

J-CUBE

Your Future CubeSats

JAXA

UNISEC
University Space Engineering Consortium

A new collaboration between JAXA and UNISEC to help emerging space nations get their ~~first~~ CubeSats deployed into Low-Earth Orbit via the ISS.

J-CUBE is not to be confused with KiboCUBE

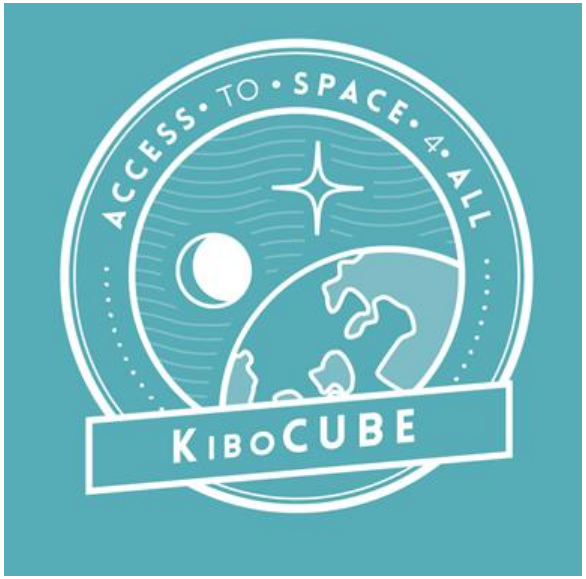
JAXA+UNISEC, low-cost opportunities

The program has two categories:
① one is construction of international collaborative relationships,
② another is for domestic capacity building.
Both categories require Japanese partners (UNISEC-Japan's universities, institutes, and technical colleges) for small sat development.

J-CUBE winners secure a low-cost launch opportunity 12U/per year (or 6 satellites/per year). The satellite size is assumed to be 1~3U.

J-CUBE:
http://unisec.jp/serviceen/j-cube

JAXA+UNOOSA, zero-cost opportunities



KiboCUBE:
https://www.unoosa.org/oosa/en/ourwork/access2space4all/KiboCUBE/KiboCUBE_Index.html

J-CUBE vs KiboCUBE

	J-CUBE	KiboCUBE
Launch price	Not free, but much lower than the market price	Free
Size	Up to 3U	1U
Selection	Application is reviewed by the selection committee	Very competitive
Requirement	**Team up with a Japanese university** Capacity building purpose	Capacity building purpose

Both will use ISS Kibo module

Typical flow

1. **Contact to UNISEC**
2. Introduction of a Japanese partner
3. First contact
4. Meeting (remote/in-person)
5. Many remote meetings and many exchange of e-mails
6. Statement of Work (SoW)
   - What to do in the collaboration
   - Responsibilities of each party
7. Contract signed
8. Money transfer
   - Usually from foreign partners to Japanese universities
9. Actual works
   - Students may come to Japan as full-time graduate students or research visiting students
10. Satellite launch and operation
11. Discussion on the next collaborative project

What Japanese universities want

- Universities are not launch brokers
  - Not doing for money
  - Expect return in other ways
    - Students, papers, etc.
- Leverage the international collaboration to promote globalization of university research/education and campus
- Japanese university may simply want to lower the launch cost by sharing with the foreign partners
- Anyway, note that you are not dealing with launch brokers

Things to be noted

- As the money transfer occurs in J-CUBE, the contract between the foreign entity and the Japanese university is necessary
- The contract is legally-binding. Need assistance from the legal section of your organization
- The points in the contract
  - Non-military use
  - UN registration
  - Export control
  - Payment due
  - Payment currency (it is in Yen!)

Suggested schemes

- Good collaboration scheme
  - Joint development of CubeSat
    - Student exchange through the project
    - Students (both Japanese and non-Japanese) learn how to work with people from different cultural background
- Other good schemes
  - Satellite is built outside Japan, but students come to Japan for study
    - Learn satellite development/testing/operation via hands-on
    - Serve as a liaison with the home country
  - Satellite is built in Japan by students coming from abroad
    - Learn satellite development/testing/operation via hands-on

Student exchange make the collaboration better and more fruitful

J-Cube satellites

Maya-5 & Maya-6 (Philippine)

Students working in Japan for final integration

Deployed from ISS on July 19, 2023 and working!

https://asti.dost.gov.ph/resources/media-release/maya-5-and-maya-6-cubesats-launched-to-international-space-station/

J-Cube satellites

KNACKSAT-II (Thailand)

Ready for flight (*almost*)

CubeSat launch methods

Method	Price	Note
KiboCube	Free	Competitive
Government free piggyback (e.g. Vega, Epsilon, ELaNa, etc.)	Free	Competitive Not accessible from other countries
Other free launch (e.g. Avio)	Free	Competitive
Commercial rocket (e.g. Falcon-9, Electron, etc.)	~100KUSD for 1U	
Commercial ISS (e.g. Space BD, MBA, NanoRack)	~60KUSD for 1U	
J-Cube	1/3 ~ 1/4 of others	

Pros and Cons of ISS deployment

- Pros
  - Lower cost than rocket launch
    - J-Cube is even lower
  - Regular launch schedule
  - Moderate launch environment
  - No shock test requirements
  - Orbit is fixed
    - Easy for frequency coordination
- Cons
  - Low altitude limiting the orbit lifetime
  - More strict safety requirements
- In addition, J-Cube opens the door to international collaboration!

Conclusion

If you want a low-cost launch opportunity and work with a Japanese university, think about J-Cube.

Use your smartphone to access more info.

http://unisec.jp/serviceen/j-cube

Google “J-Cube UNISEC”

What do we do from now?

- Group discussion
- Each group shall discuss
  - What is your wish to the launch method if you build and launch an educational 1U CubeSat?
    - Cost
      - What is a good value for 1U CubeSat?
      - Don’t say “free”.
    - Others
- At the end, each group will make a short summary presentation