

PocketQube: A New Opportunity and It's Challenges

Group Discussion No. 5

(Summary)

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Group 5

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PocketQube is a pico-satellite of size 5 cm cubed, and weighs 180 grams. The standard was proposed by Prof. Bob Twiggs, who also introduced CubeSat standard. For a developing country the cost of CubeSat projects is still very expensive, which can cost at least 100k US dollars. The building cost of PocketQube could be as cheap as 5k US dollars, and the launch cost is around 25k US dollars. In addition, the development time is short, therefore, undergraduate and graduate students can learn the complete cycle of the satellite development, launch, and work on post processing of the downlink data.

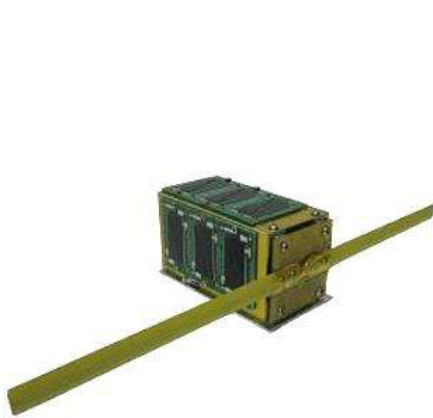
The PocketQube can be used for teaching about small-satellite technology at university level. It can also be used by educational and research institutes, as a platform for capacity building, technology demonstration, and technical development of space research at a very low cost.

Discussion Contents:

1. Advantage of moving from CubeSat to PocketQube for small company and educational institute, and developing country
2. Investigation of possible Payload for PocketQube
3. Identifying potential launch providers
4. Possible collaboration among the participants' institute and company in the discussion group
5. Debris risk of PocketQube

GAUSS launched PocketQubes

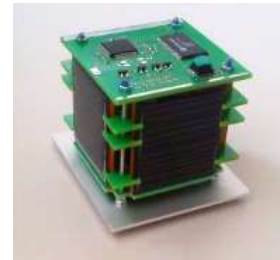
- PocketQubes carried into space with UniSat-5 (2013)



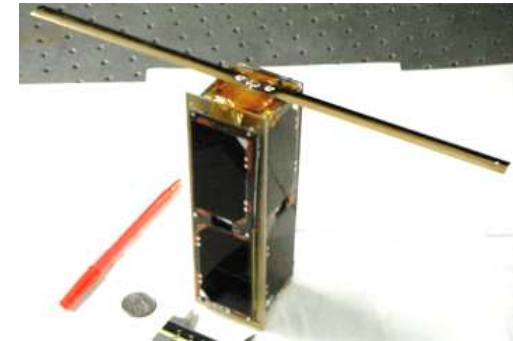
Eagle-2 / 50\$Sat (1,5P)



Eagle-1 / T-LogoQube (2,5P)



Wren (1P)



QBScout (2,5P)

Advantage and Disadvantage

Advantage	Disadvantage
Cheaper	Small size, and less space for Payload
Accessible	Power limitation (400mW for 1P)
Easy Design, Short Development Time	Very expensive solar cells
Possible Collaboration between Universities	
Cheaper SDR Ground Station (receiver)	

Educational Application

Educational Purpose		
High-School		University
- Classroom		- Classroom
- Space		- Space

Missing Information and Small Community

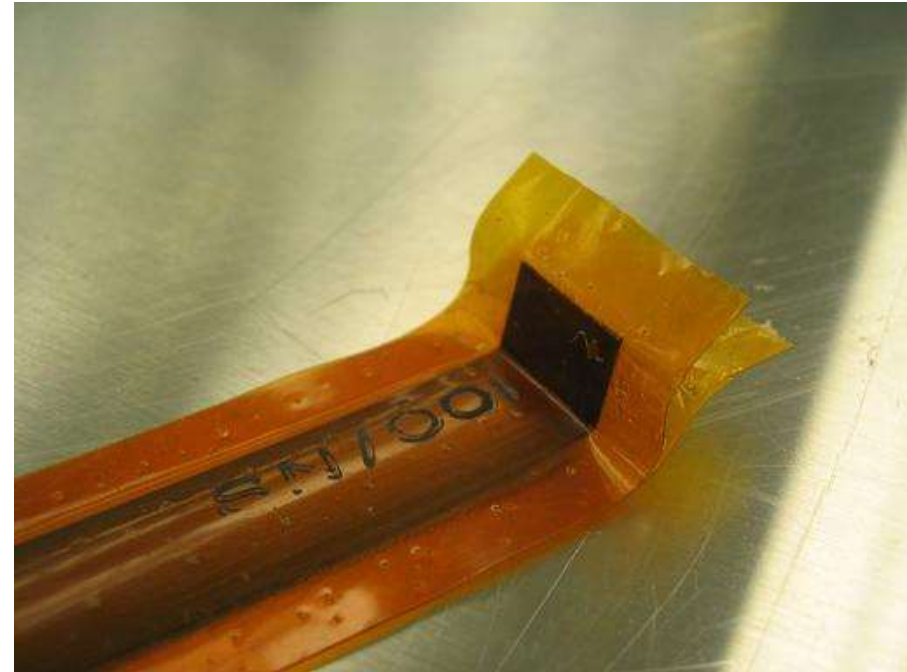
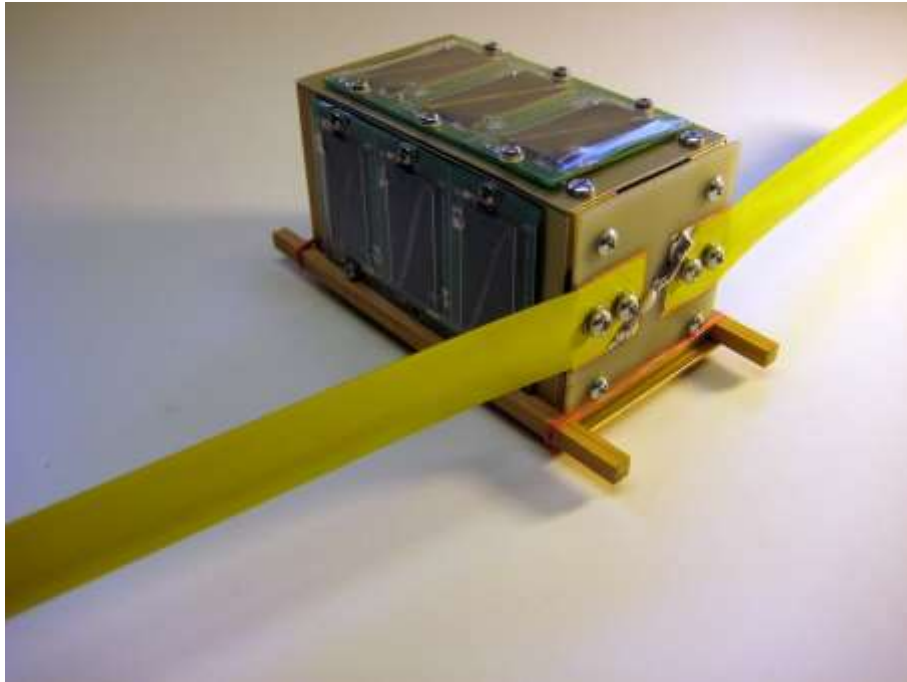
- Need to grow the community
 - More collaboration
 - Share projects
 - Share launch cost
 - Standardization for Collaboration example: PQ-60, PQ-9 (TU Delft)

Amateur Radio Frequency and Ground Station

- SDR based ground-station

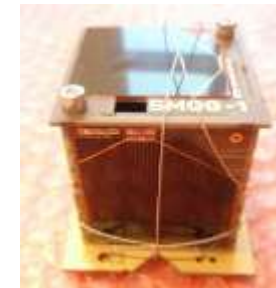
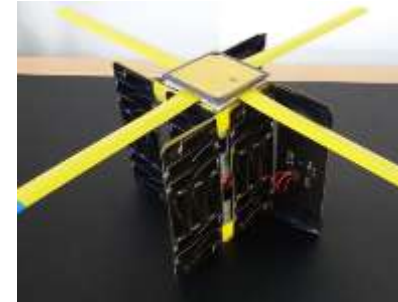
Space Debris

- 200 km to 400 km LEO is not a problem
- Above 400 km need to increase the surface area



PocketQubes on UniSat-7 (2018)

- UNICORN-1 (Alba Orbital, UK)
 - Size 2P
- SMOG-1 (University, Budapest)
 - Size 1P
- DIY/Arduiqube (DIYSat., Argentina)
 - Size 1P



PocketQubes launch opportunity

- Still available on UniSat-7
 - Up to a 4P or combinations
- Min N° of PQ units required
 - At least a 3P or combinations
- Cost depends on N° PQ units
 - from less than 20K up to 27K for each 1P



Next launch dates

- Soyuz-Fregat
 - 2019 – 4Q (2020 – 1Q)
- Work in progress for launch opportunities:
 - Long March-2, 2018 - 4Q (2019 - 1Q)
 - ISS (JAMSS/JAXA) (...thinking to the future)

• **THANK YOU**