

---

# **STUDY OF THE APPLICATION OF A NANOSATELLITE DESIGNER FOR THE DEVELOPMENT OF STEM EDUCATION**

Scientific supervisor:Amirkhan Temirbayev  
Language consultant: Nadezhda Bershina  
Prepared by:Aidana Ussentay

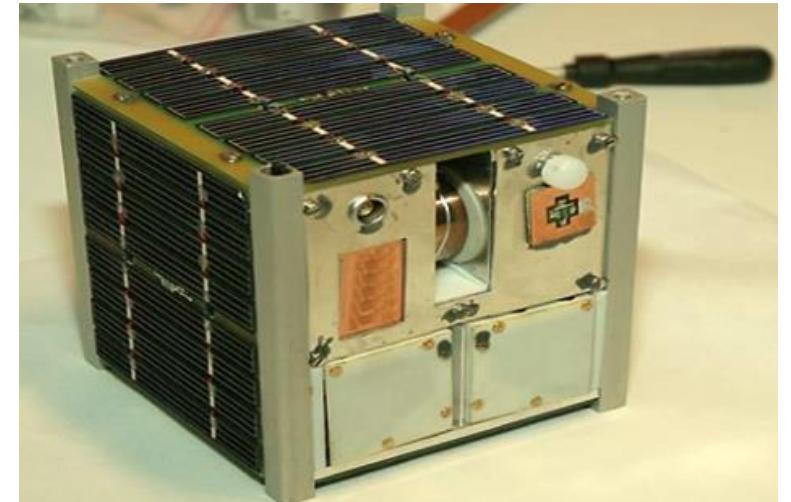
**Purpose:** *Study the application of the nanosatellite designer for the development of STEM education.*

- ✓ Small satellites are a sort of artificial soil satellites that are light in weight and estimate.
- ✓ STEM education- science, technology, engineering, and mathematics education.



# CUBESAT

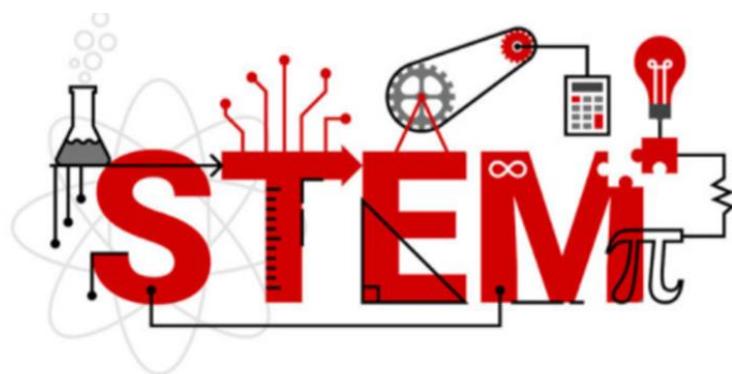
- ✓ A **CubeSat** - is a nanosatellite with standardized mechanical interfaces for a launch interface adaptor and comprises one or more units of 10 cm × 10 cm × 10 cm.
- ✓ First CubeSats were developed in 1999 by **California Polytechnic State University at San Luis Obispo** (Cal Poly) and Stanford University.



CAL POLY



- ✓ The research concentrate on implementation of CubeSat nanosatellites to create a tool for its future usage in STEM education.
- ✓ CubeSats offers an alternative that typically has shorter development times, a reduced set of requirements due to less system complexity, a shorter overall life, and generally a higher level of acceptable mission risk than conventional satellites.
- ✓ CubeSat programs provide training opportunities for young scientists and engineers at Kazakhstani center, such as «Science park» at Al-Farabi Kazakh National University and in the industrial sector.



# THE CUBESAT SPECIFICATION SOLVES SEVERAL HIGH-LEVEL PROBLEMS:

- ✓ Reduced deployment costs
- ✓ Reduces workload
- ✓ Standard sizes



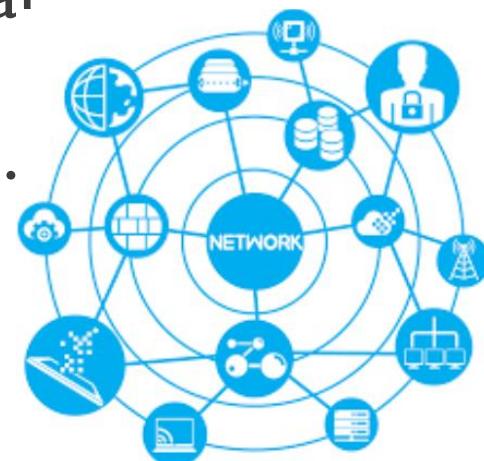
## LITERATURE REVIEW

### “History and statistics on CubeSats missions from 2000 to 2012”

- The article presents the first-ever statistical history of CubeSat class spacecraft based on the compilation of an extensive database of CubeSat class missions using a number of sources.

### “Deep space networks and interplanetary Internet”

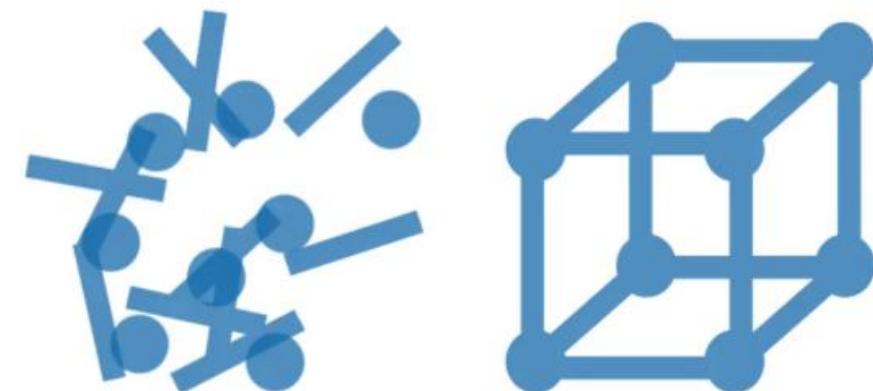
- Article focuses on the network scenarios and emulation environment considered for experimentation and the computation of packet transmission latency from source to destination.



## LITERATURE REVIEW

### **“History, statistics, and applications of CubeSats missions”**

- ✓ Provide a structured approach to CubeSat development
- ✓ The article uses a reference design based on data of a real CubeSat that was conducted at the Luleå University of Technology (LTU).



## LITERATURE REVIEW

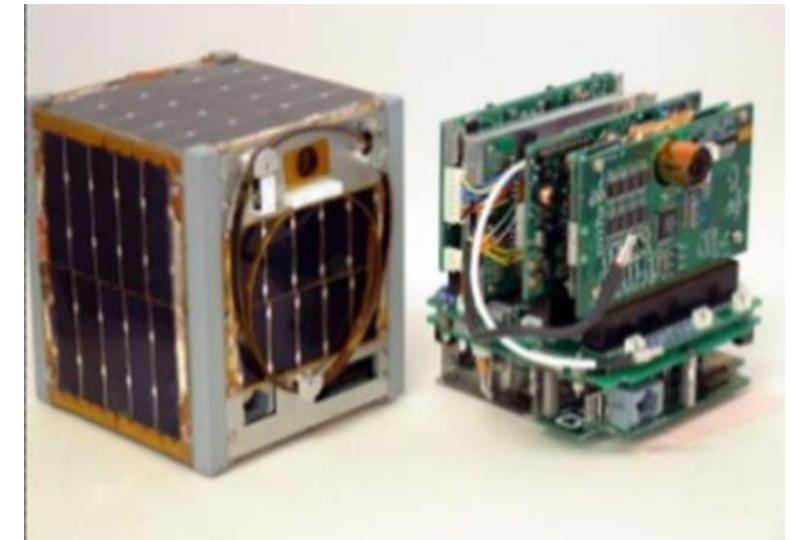
### “State of the satellite industry report”

- ✓ The number of CubeSat launches has increased from one CubeSat launched every 4 months in 2005 to almost 24 CubeSat launches every month in 2017.
- ✓ CubeSats made up the majority of the roughly 300 nano- and micro-satellite satellites launched in 2017.
- ✓ The number of scientific and technical publications and the number of patent applications related to CubeSat have increased significantly.



# CONCLUSION

- ✓ *CubeSat is an excellent testing ground, and the educational focus of the creation of such satellites allows a wide range of specialists to explore problematic issues, as evidenced by the existing global interest associated with the use of CubeSat for solving various problems, such as remote sensing of the Earth and scientific applications.*



## REFERENCES

1. Michael Swartwout (2013) History and statistics on CubeSats missions from 2000 to 2012 [1]
2. Joyeeta Mukherjee (2013) Deep space networks and interplanetary Internet [2]
3. Martins, E (2018) History, statistics, and applications of CubeSats missions [3]
4. SIA—Satellite Industry Association, «State of the satellite industry report», Bryce Space and Technology, 2017.