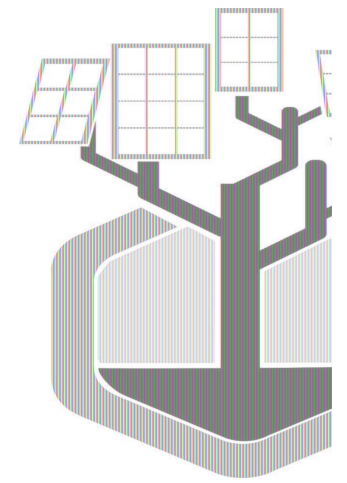




Al-Farabi Science Park

UniSat

LAUNCH YOUR DREAMS



UNICEF Kazakhstan Country Office - Skills for Girls: Nano-satellites programme

Project Coordinator

Amirkhan Temirbayev

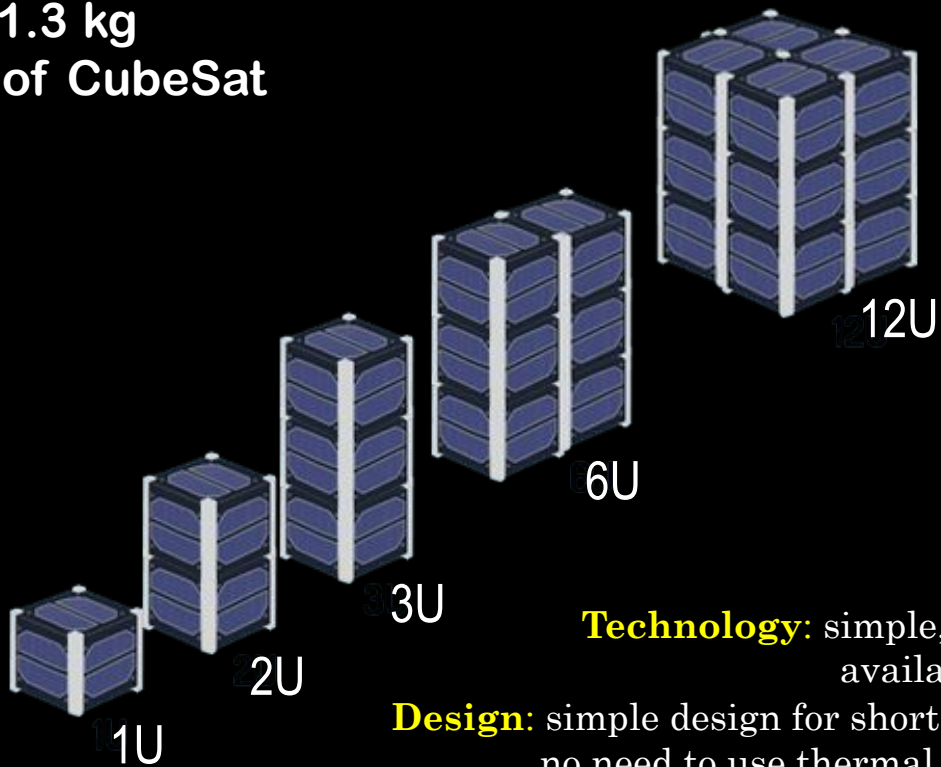
What is a CubeSat



10x10x10 cm
Dimensions of CubeSat

1.3 kg
Mass of a CubeSat

1.3 kg
Mass of CubeSat



Technology: simple, standard parts available off-the-shelf

Design: simple design for short mission; no need to use thermal blankets

Fast: can be built within two years

Cost: far less expensive than large satellites

SMALL SATELLITES

LARGE SATELLITE



RADARSAT-2



>1000 kg

MEDIUM SATELLITE



CASSIOPE



500-1000 kg

MINI SATELLITE



SCISAT



100-350 kg

MICRO SATELLITE

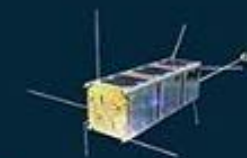


M3MSat



10-100 kg

NANO SATELLITE including CUBESAT



Ex-Altia 1

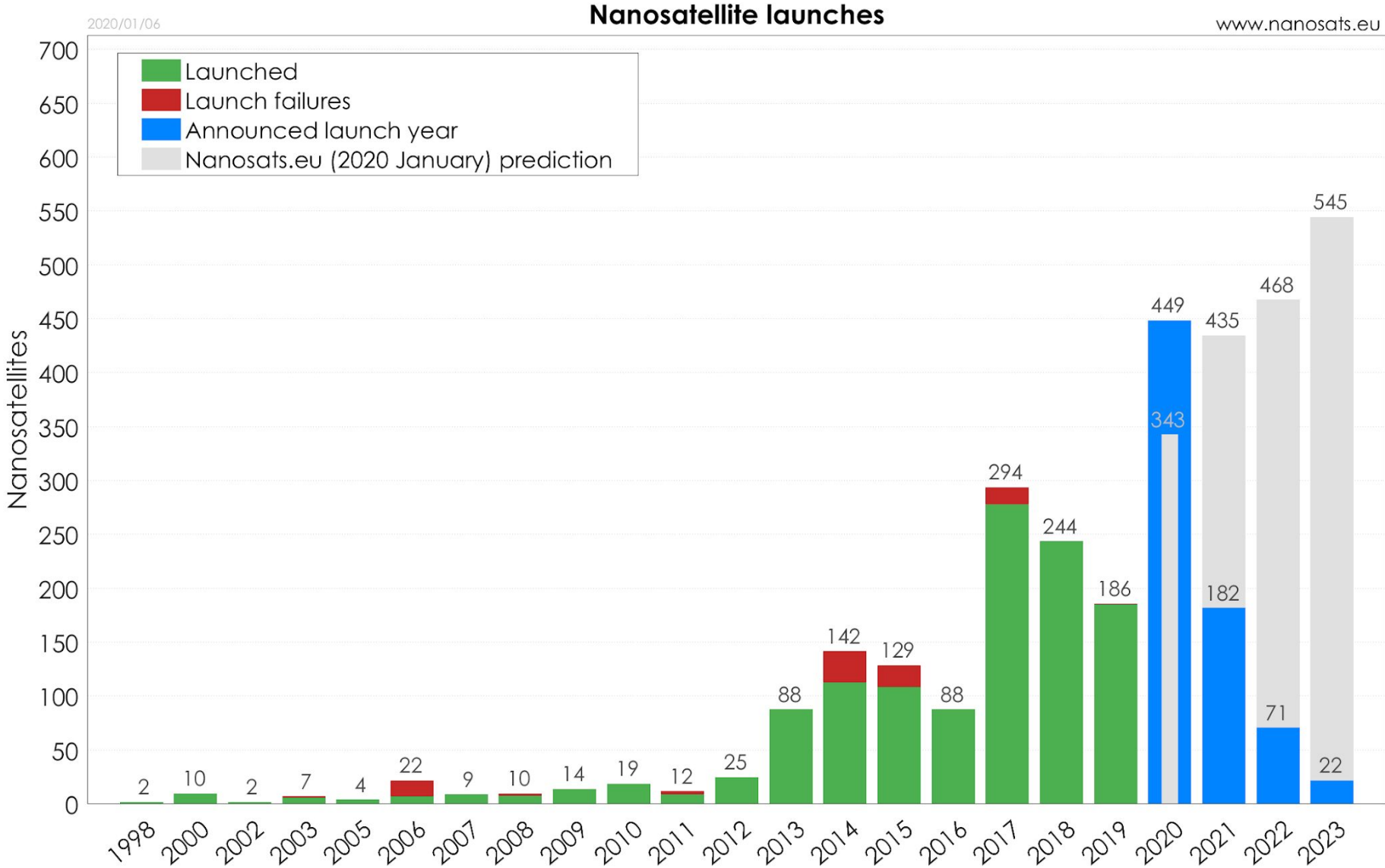


1-10 kg

1 kg per unit

Note: These weights are approximations.

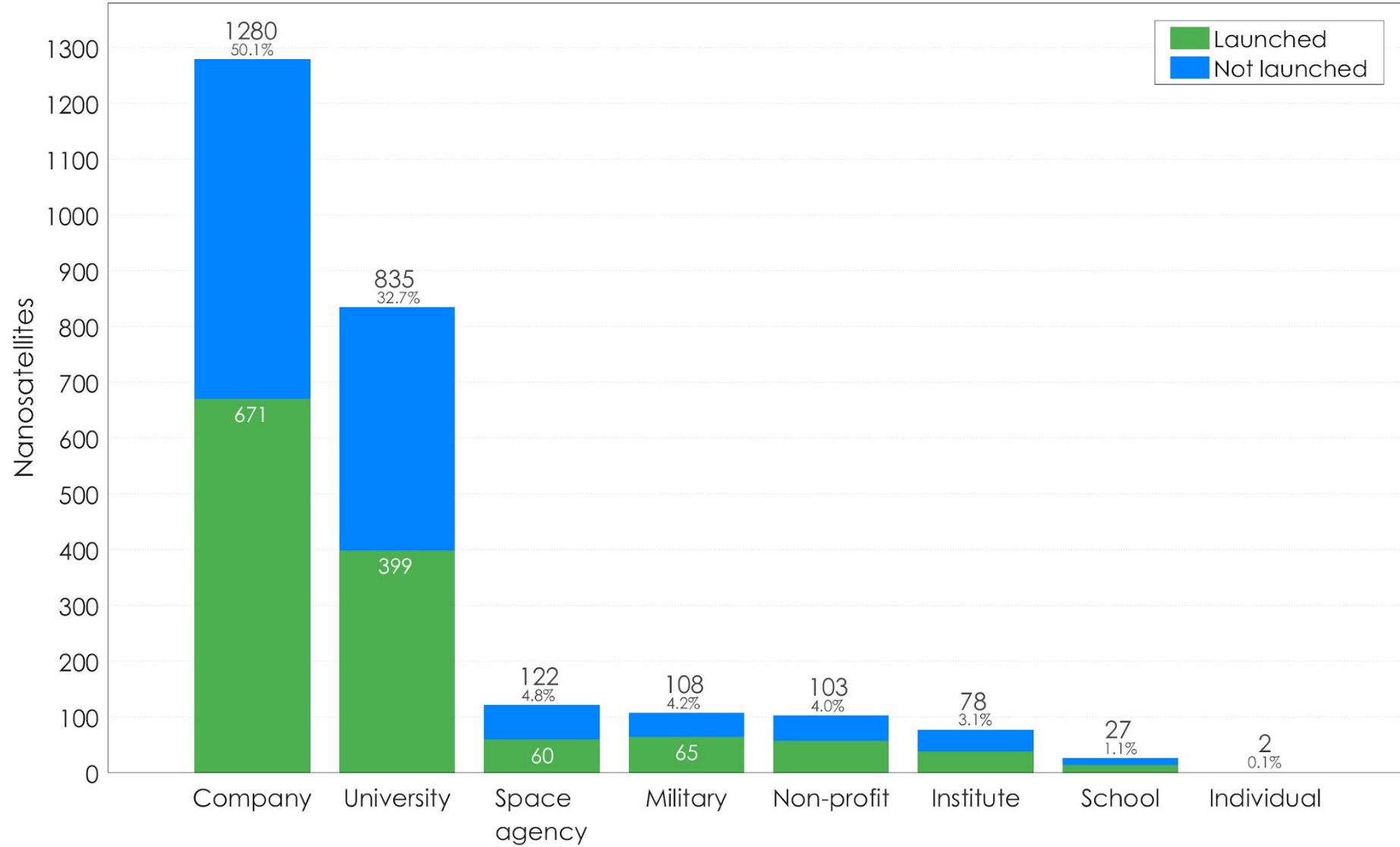
SMALL SATS – NEW TRENDS!



Nanosatellites by organisations

2020/01/06

www.nanosats.eu



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Four types of missions



Technology demonstration

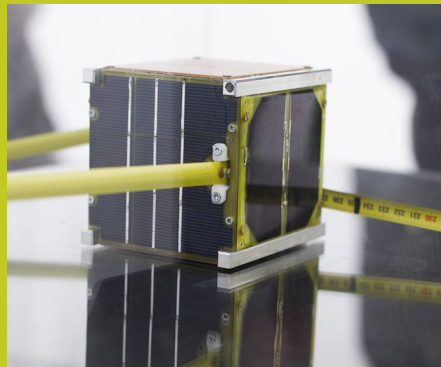


Fox-1D, AMSAT

Demonstrate high energy radiation instrument and amateur radio payload



Science

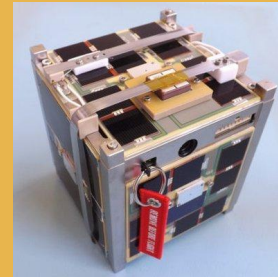


LitSat-1, Kaunas Technology University

Scientific platform for the future experiments with piezo motors in space



Educational projects



BEESAT-4, Berlin Technical University

Educational training and demonstrate CubeSat platform technologies plus camera



Commercial



DOVE SERIES, Planet

Constellation for optical Earth observation with 3-5 m resolution

The benefits of using CubeSats

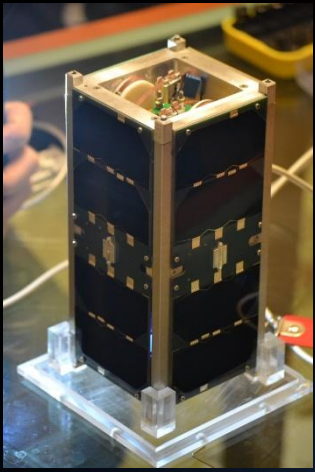
Pros

- ◆ **Fast:** can be built within two years
- ◆ **Cost:** far less expensive than large satellites
- ◆ **Technology:** simple, standard parts available off-the-shelf
- ◆ **Design:** simple design for short mission; no need to use thermal blankets
- ◆ **Space debris:** none – they burn up in the atmosphere upon re-entry

Cons

- ◆ **Scope:** limited due to reduced capacity to carry scientific instruments
- ◆ **Mission duration:** most of them are operational for a period of 1 to 3 year

Al-Farabi KazNU's NanoSat projects



Al-Farabi -1
(PSLV, 2017/2)



Al-Farabi -2
(Falcon-9, 2018/12)



Al-Farabi -2 launched
by SpaceX its Falcon
9 rocket with 63
other satellites



The main Mission of the first Kazakhstani nanosatellites is educational one: to develop own space technology scientific school

Technological mission: Technological demonstrating of own onboard computers, ground station, antenna systems

Scientific mission: radiation influence on memory cells of microcontrollers

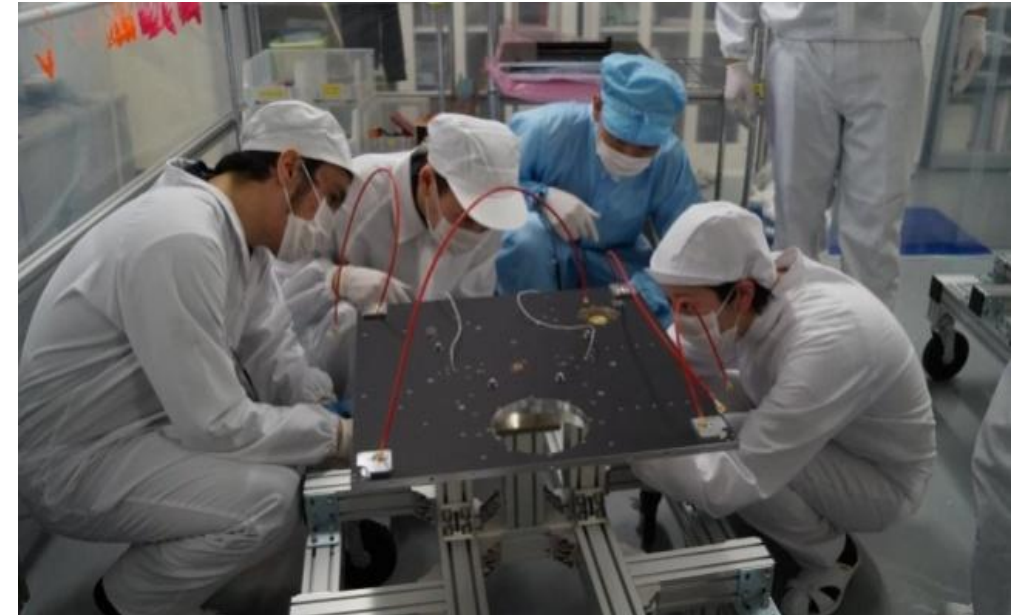
Al-Farabi -1 launched
by ISRO's PSLV- C37
mission with 103
other satellites



SCIENTIFIC SCHOOL OF KAZNU ON SPACE TECHNOLOGY



Rector of KazNU before sending undergraduates of KazNU to University of Tokyo



Students and undergraduates are working on satellite assembly (University of Tokyo)

2010 - The beginning of the preparation of bachelors in Space Engineering and Technology

2012 - Signing of Agreement with University of Tokyo on the internship of KazNU students under the UNIFORM project

2013 - The beginning of the internship of master degree students in University of Tokyo

2013 - The beginning of first nanosat project under the leadership of the rector G. Mutanov in the framework of Government Grant Financing (as a result al-Farabi -1 was launched)

2015 - The beginning of second nanosat project under the leadership of the rector G. Mutanov in the framework of Government Grant Financing (as a result al-Farabi -2 was launched)



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UNISAT NANO-SATELLITE EDUCATIONAL PROGRAMME FOR GIRLS (UNEPG)

“On Earth, men and women are taking the same risks. Why shouldn't we be taking the same risks in space?”



World's first woman cosmonaut
Valentina Tereshkova

«If we want scientists and engineers in the future, we should be cultivating the girls as much as the boys».



First American woman in space
Sally Ride



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Nanosatellite Development Methodology for the UNEPG project



Discover the UNEPG facts:

Project funded by UNICEF & organized by Al-Farabi Science and Technology Park.

-  Founded by UNICEF.
-  Organized by Al-Farabi STP.
-  Standard by ECSS.
-  Powered by professionals.

[LEARN MORE](#)

[MEET THE TEAM](#)



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OUR TEAM

Coordinator – Amirkhan Temirbayev
Co-coordinator – Tolkynai Shynazarova

Engineers:

- Ozat Tuenbayev
- Sabyr Orynbasar
- Nursultan Meirambekuly

Programmers:

- Azat Yaakov
- Nursultan Uzbekov



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Methodologies based on systems engineering and the ECSS standards

According to ECSS-M-ST-10C Rev.1 Project planning and implementation, a space project is divided into the following phases:

Phase 0: Mission analysis/needs identification

Phase A: Feasibility

Phase B: Preliminary Definition

Phase C: Detailed Definition

Phase D: Qualification and Production

Phase E: Utilization

Phase F: Disposal

This structure comprises and orders adequately all processes, tasks and work packages in the development of a traditional space mission. Important reviews take place at the end of each phase, i.e. to proceed with the next phase a formal review must be successfully passed. Some of these reviews are:

MDR: Mission Design Review

PDR: Preliminary Design Review

PRR: Preliminary Requirements Review

CDR: Critical Design Review

AR: Acceptance Review

LRR: Launch Readiness Review

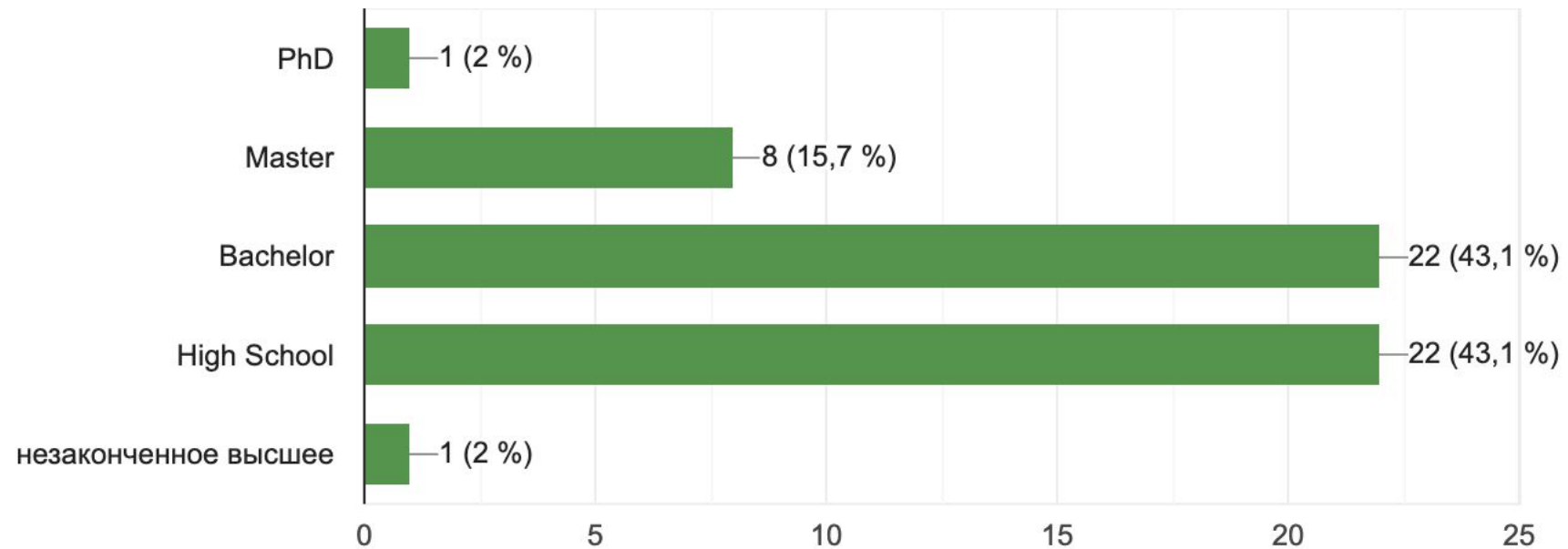
ELR: End-of-Life Review



PARTICIPANTS OF THE UNEPG

Highest Grade Or Level of Education

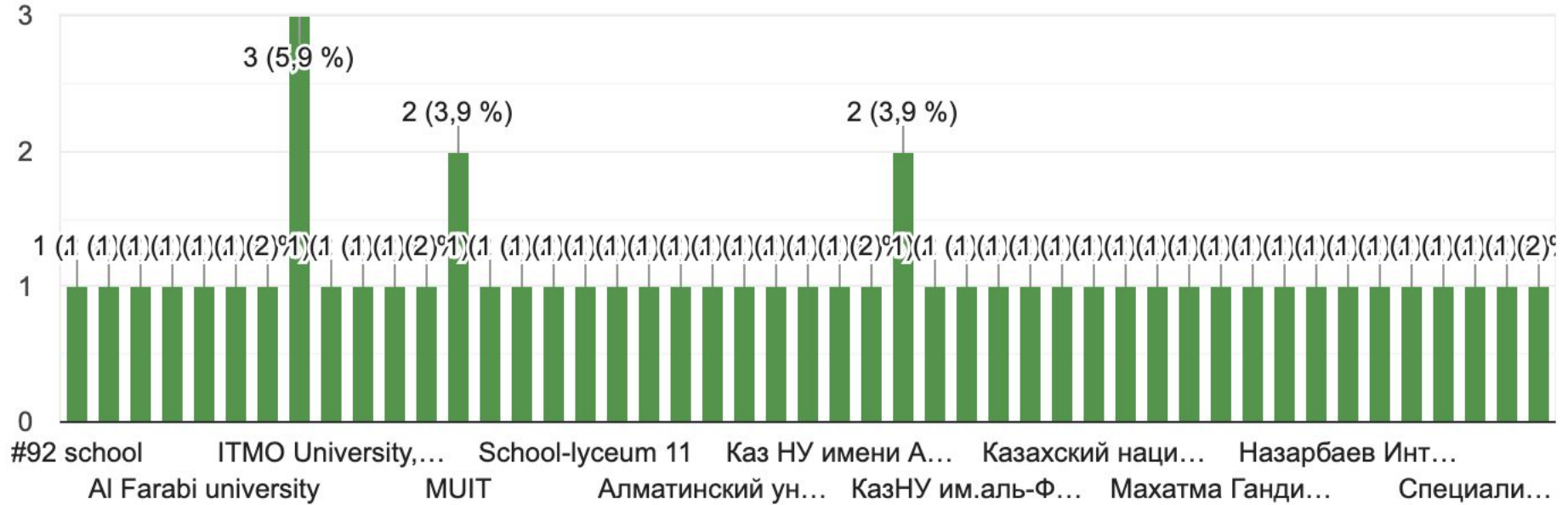
51 ответ



PARTICIPANTS OF THE UNEPG

Current University / School

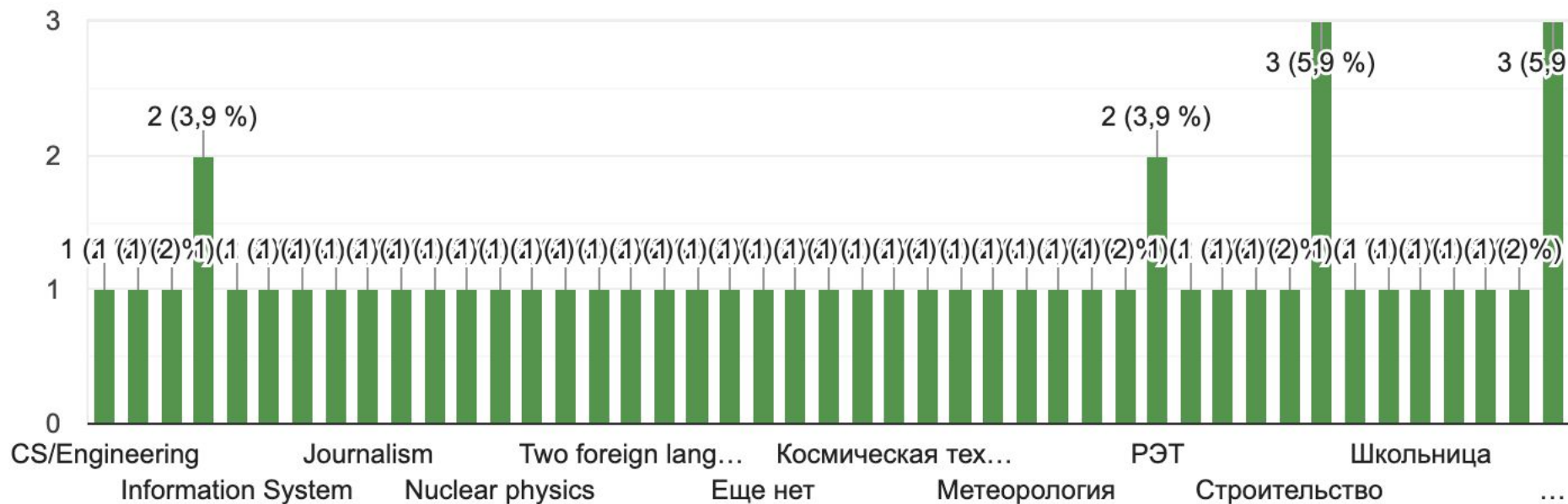
51 ответ



PARTICIPANTS OF THE UNEPG

Speciality

51 ответ



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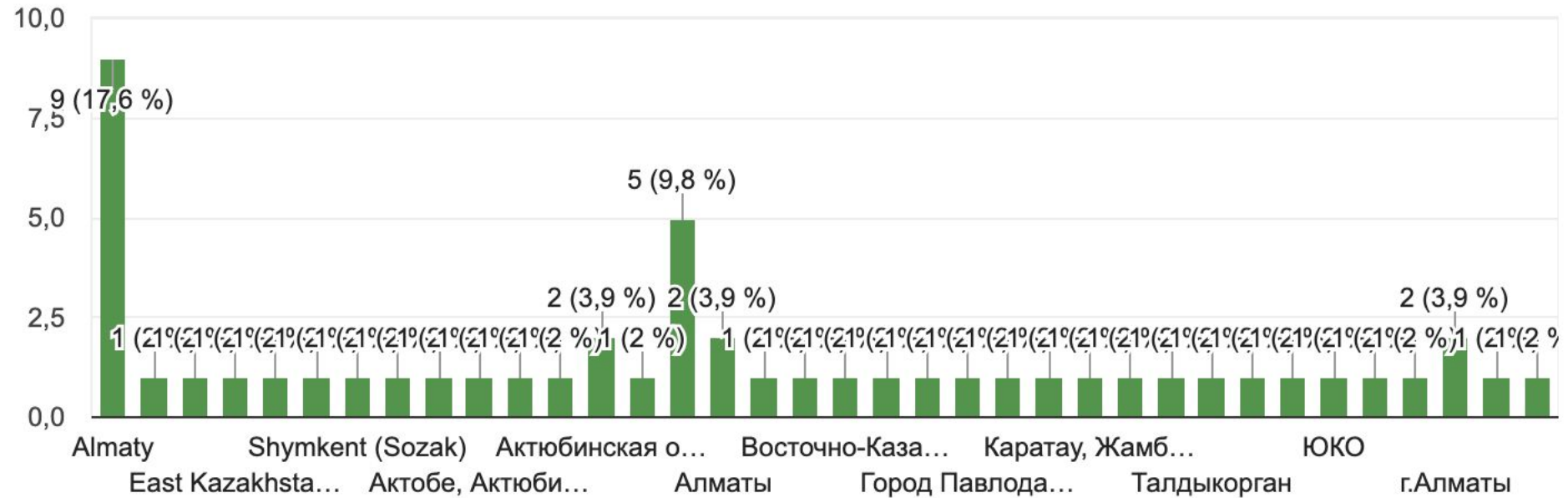


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PARTICIPANTS OF THE UNEPG

Region / city of birth

51 ответ



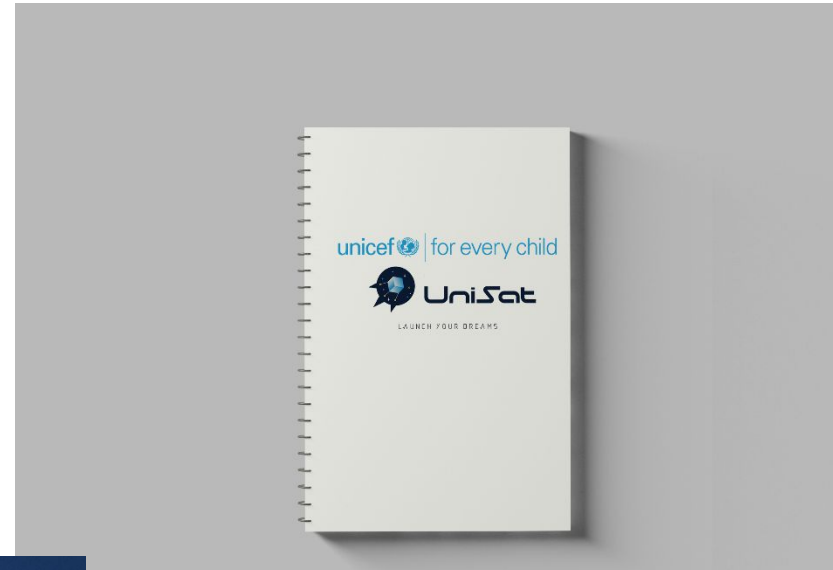
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BRANDED MATERIALS



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THANK YOU FOR ATTENTION!

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