



Aero-Engineering School International experience



■ *Web: <http://roscansat.com>*

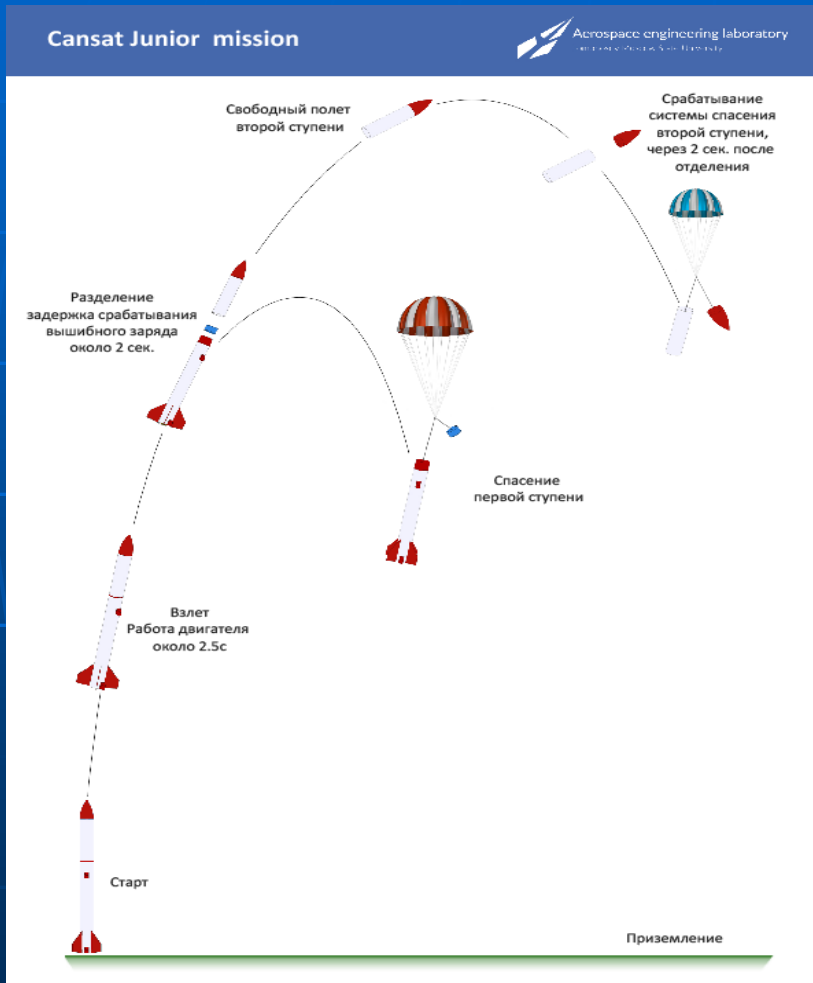
What is it AES?

- This is a competition of school teams that must assemble, solder, program, test the existing model of the spacecraft from the kit given to them..
- This spacecraft, deliver to a height of 1-2 km, must descend to measure the distribution of temperature and pressure in the atmosphere.
(obligatory task), to transfer this all to Ground Station via a radio channel, as well as to fulfill your own, unique task, which the team itself will invent..
- **(IMPORTANT !!!)** "Spacecraft" should get into a 0.5 liter can and weigh no more than 350g.

STRUCTURE OF THE CHAMPIONSHIP

- Junior League (6-8 grade) - 2016
- Regular League «CANSAT in RUSSIA» (8-10 grade) - 2011
- High League (9-11 grade) - 2013
- Student League (students 1-2 grade) - 2014
- GIRD-II (any grade) - 2014
- UAV (any grade) - 2014
- UFO – 2018
- New league in this year Super GIRD-II - 2019

Junior League

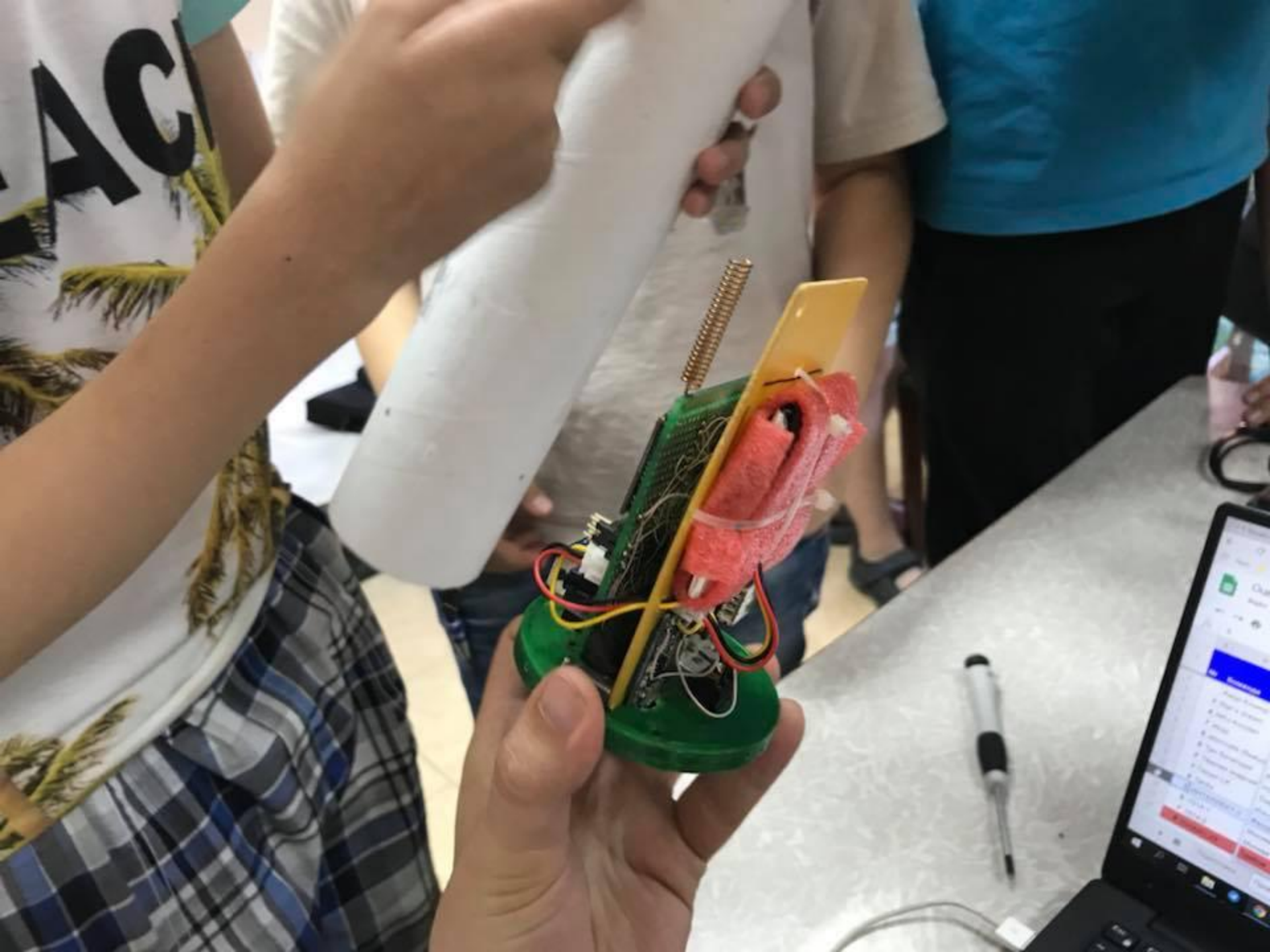


Main task of this league is:

- Preparing to participate in the Regular League

Main task of participants:

- Development of an electronics and payload rescue system for a launch vehicle using a kit based on Arduino technology provided by the project organizers





Junior League LAUNCHERS



Regular League

The competition for the development and making of training "satellites".

The participants develop their satellite Cansat based on the basic kit, go through all stages from theoretical and experimental design to launching a satellite to a height of 1 km using a launch vehicle in the summer of the championship final.

What is it KIT ?

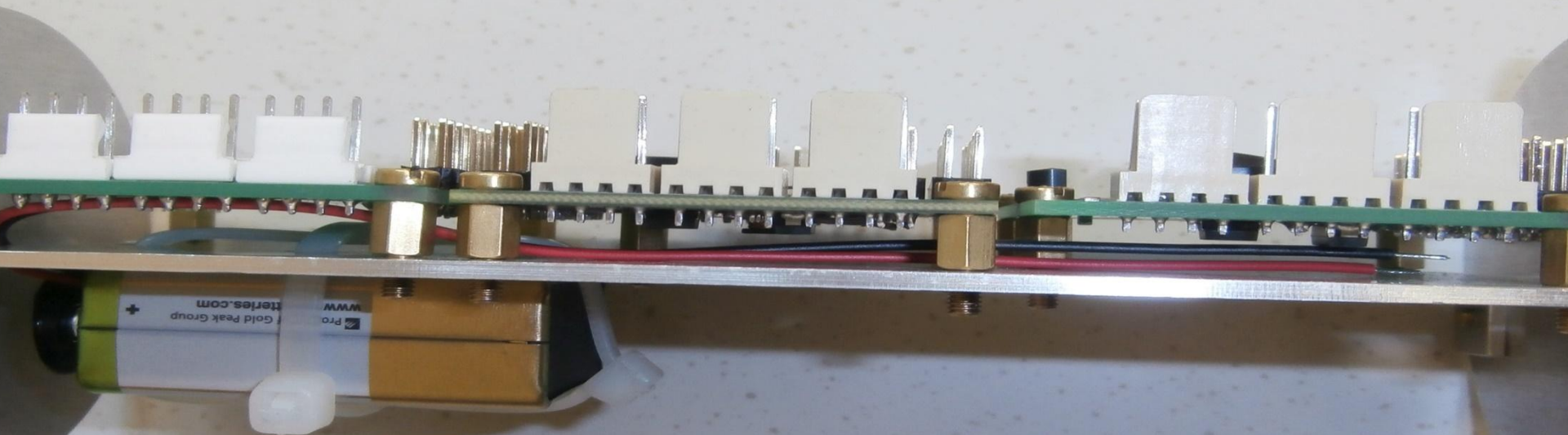
Three PCB:

- Main PCB MCU Atmega128;
- Payload PCB (temperature, pressure and acceleration sensor);
- RF PCB, frequency 2,1GHz;
- Mechanical structure

KIT



2012/10/08



2012/

Tasks which team should **DONE:**

Solder the PCB of KIT;

Programming the MCU;

To collect information from sensors and convert it into a sequence of codes for transmission to Ground Station;

To test the device for vibration resistance and overload resistance;

Calculate and make a parachute system; ensuring smooth descent of the device;

Take telemetry on Ground Station.

Scientific Tasks.

Main tasks:

Measurement of temperature and pressure during the flight of the satellite and the make of the trajectory according to the accelerometer

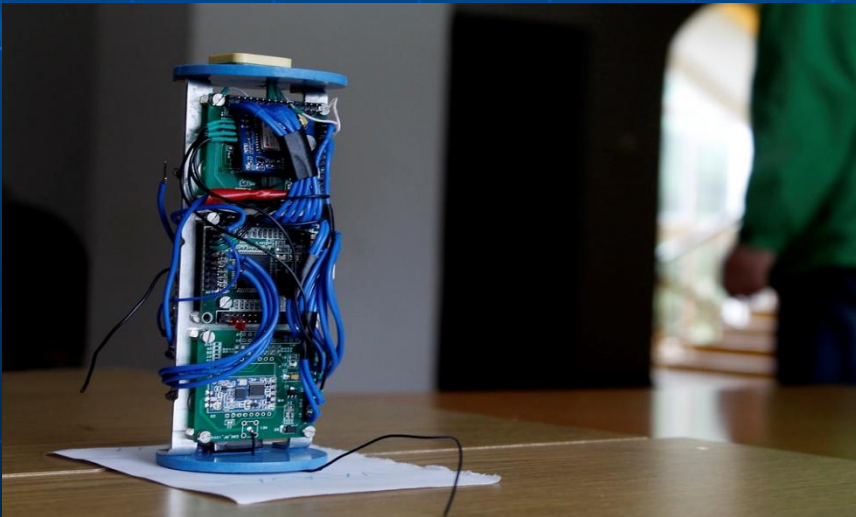
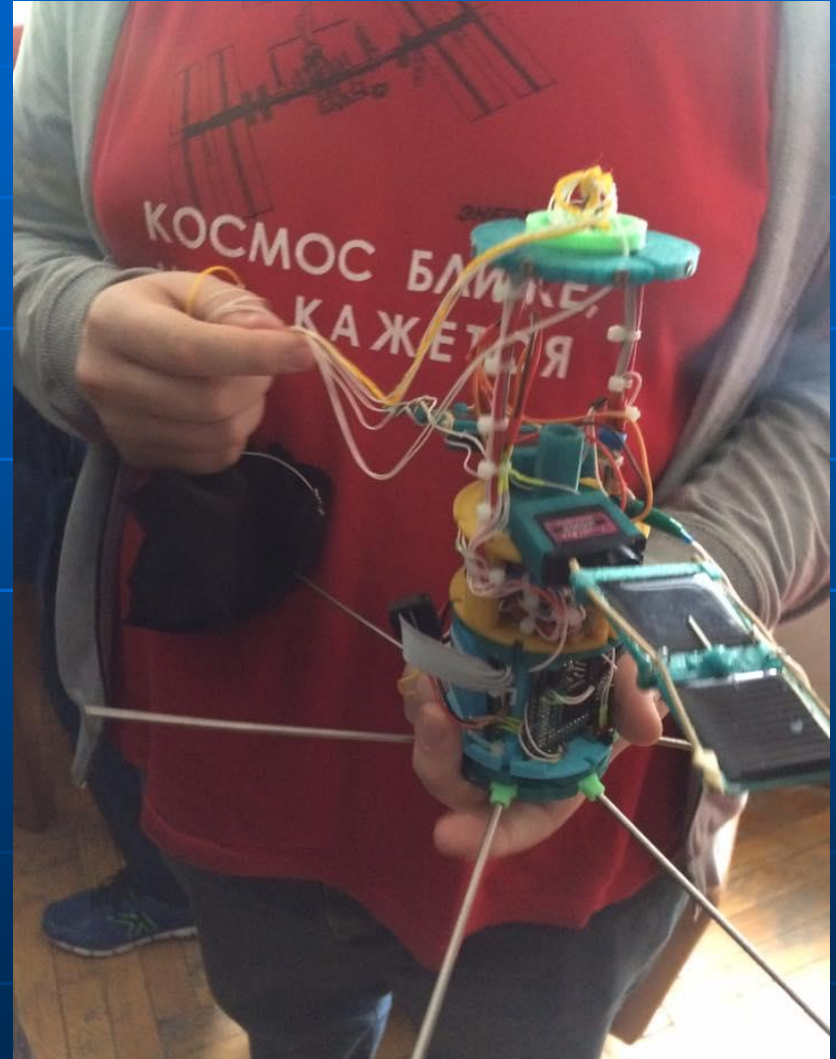
Additional tasks:

Installation of additional sensors and detectors, development of alternative rescue systems, author's engineering and technical solutions. (within the established weight and dimensional requirements)

NOT ALLOWED:

- Use of pyrotechnic devices
- Experiments with live creatures

«Satellites» Cansat

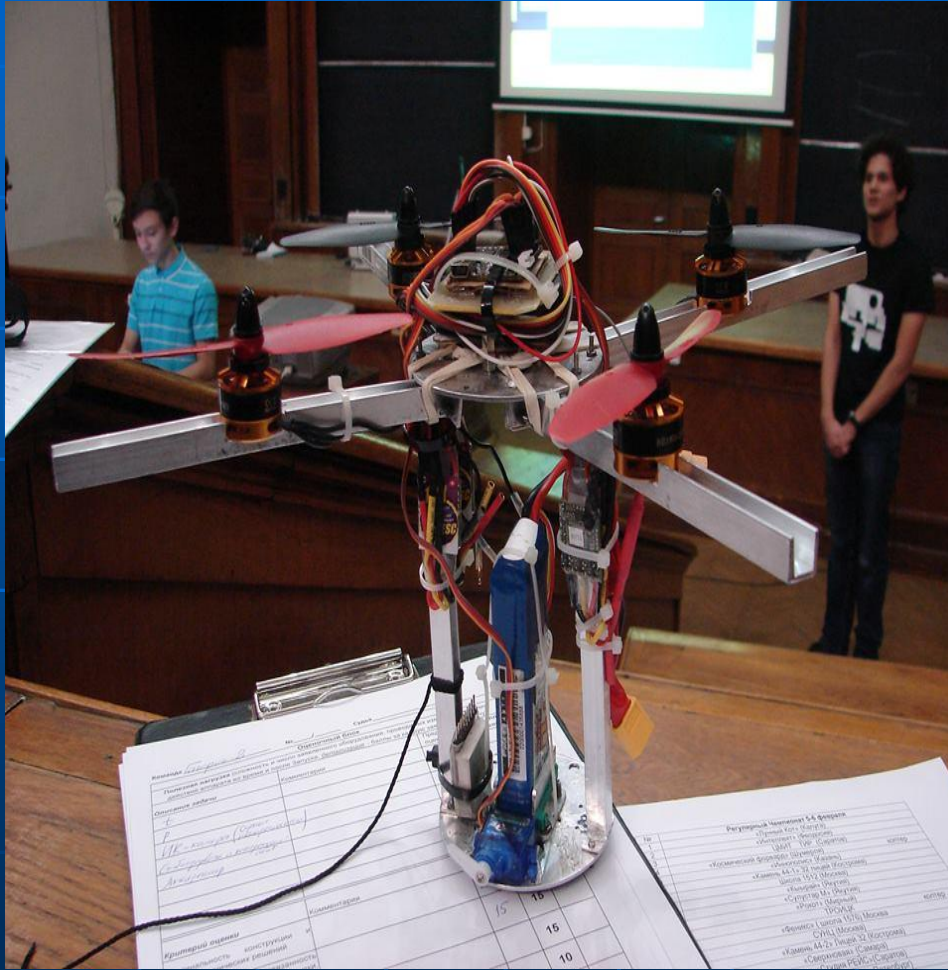


High League

A team that successfully competed in the previous season in the regular league

Higher league participants are given more serious engineering and scientific tasks to develop an satellites of their own design..

High league



Hit of the season
2015.

Cansat and the
copter "in one can"

Team "Gagarin"
Kazan

Student League

Teams of undergraduate students of technical and natural sciences are invited to participate in the Student League. It is allowed to attract to work in a team of schoolchildren who have experience of successful participation in the High League of the championship.

The device, developed by the participants, will delivery using a balloon to a height of 25 - 30 km.

Подготовка к старту шара-зонда



OUR ROCKETS

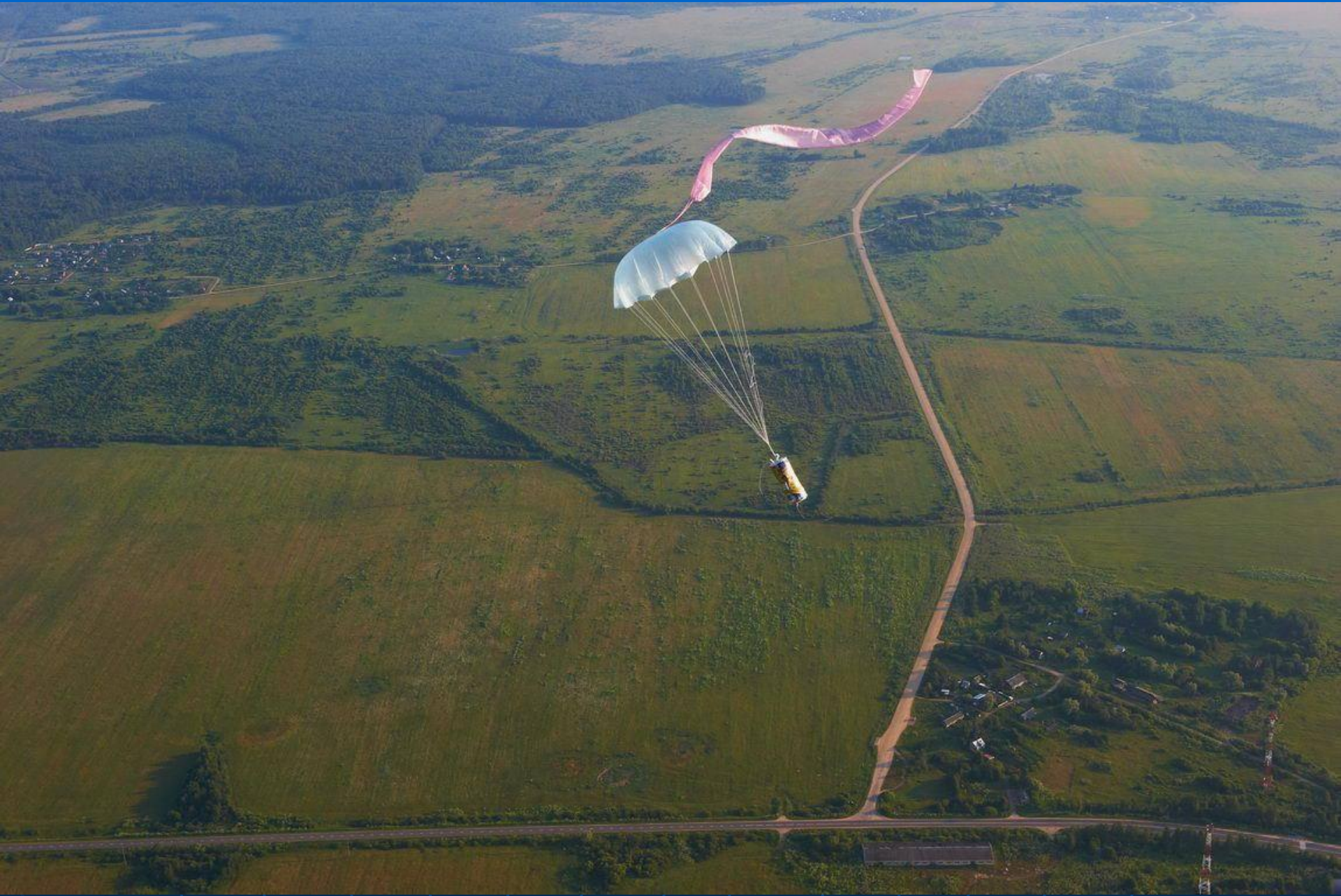


Regular League

- 2011 – Helicopter (2km)
- 2012 – Quadcopters (800m)
- 2013 – Balloon (1 km)
- 2014г – 70 m.
- 2015г – 200 m.
- 2016г - 800 m.
- 2020г - 1000 m (weight 1kg)





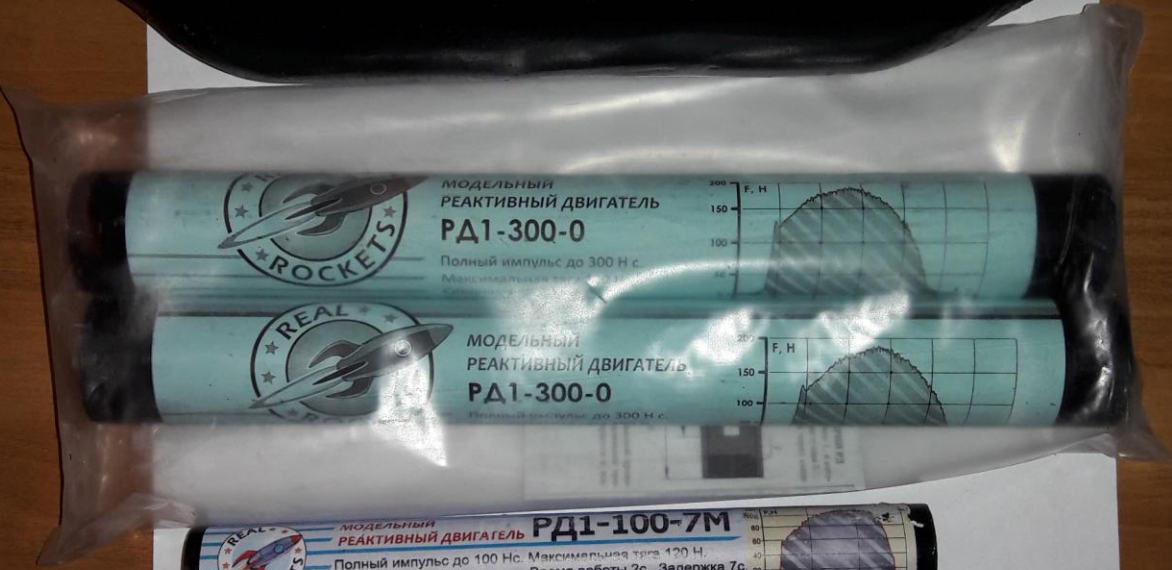














GIRD-II.

Main task - developing launcher regular league

GIRD-II Junior:

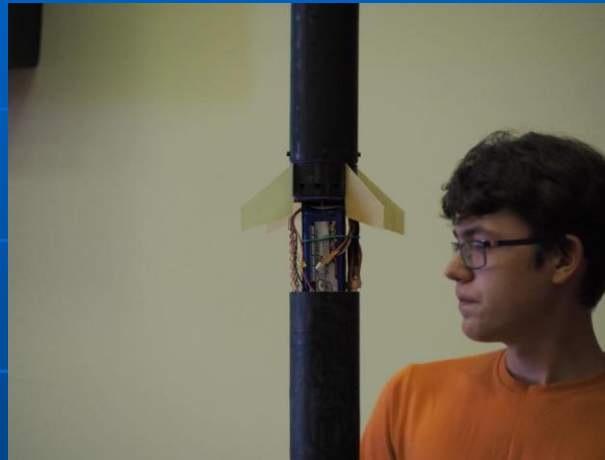
- Height 200 m
(engine 100 Ns);

GIRD-II High:

- Height 800 m
(engine 300 Ns)

Super GIRD-II

- Height 1200 – 2000m
(engine 1500 Ns)



GIRD-II

Rocket-Plane
Team «Wings»



UAV

Main task is:

Making an unmanned aerial vehicle to perform the task of finding fires on a route 2 km long and transmitting the coordinates of the source to the point of reception



UFO

Main task is:

Making an undefined vehicle which will delivery satellite on the altitude more than 200 m.



Team

Team leader (consultant)

Captain

Hardware programmer

Physics

Designer

PR and others

.....

Teams.

GAGARIN Kazan



BelSat. Minsk



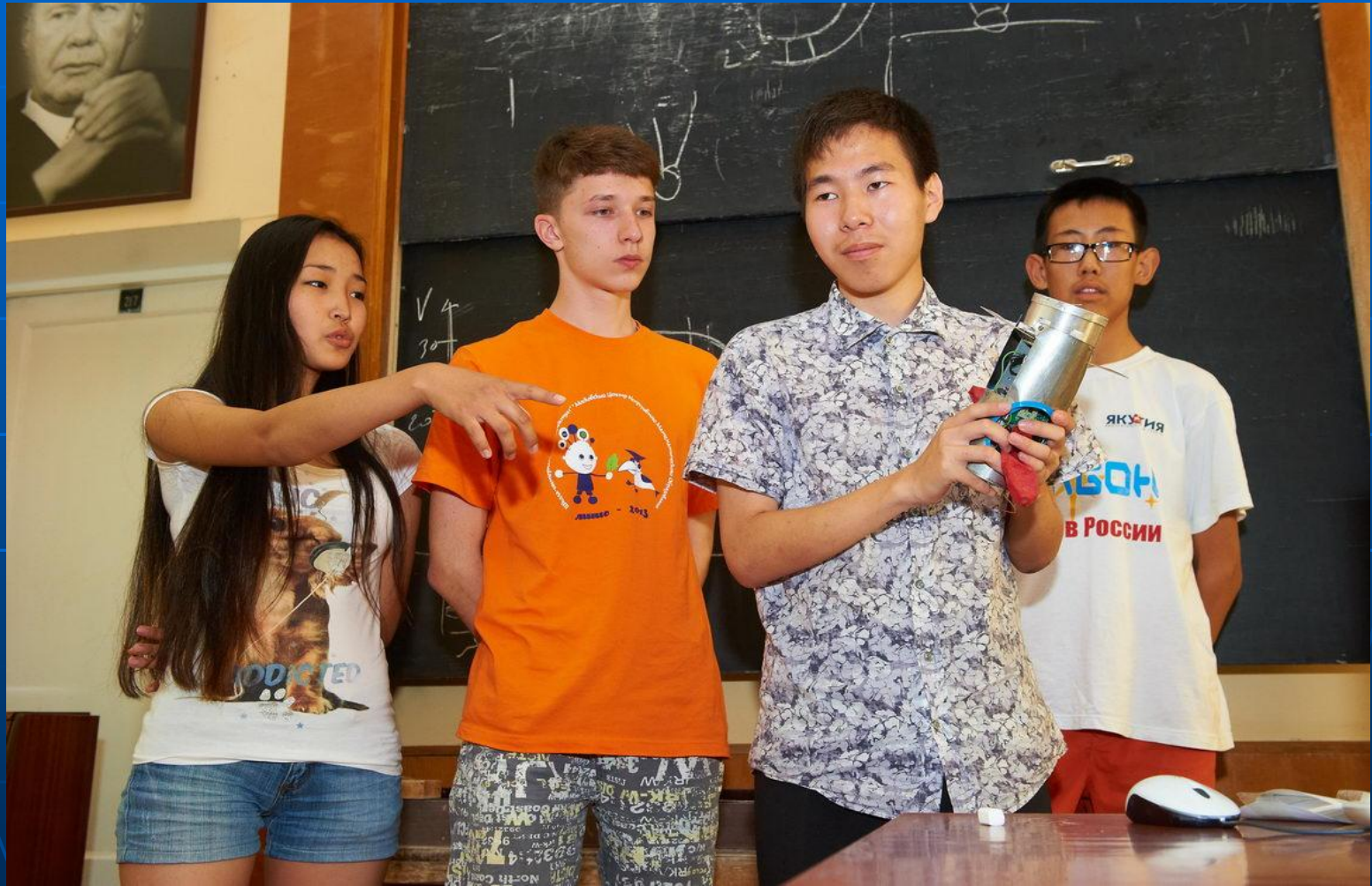
High School # 8, Shumerlya



MAG3 Sant-Petersburg



«Cholbon» Yakutia



Structure of championship

- **September – Open Championship.**
- **November – Lecture and Webinar start**
- **End of January – Qualifying session (winter session)**
- **March – month report**
- **April – month report**
- **May – video report (main mission check)**
- **June – month report**
- **First week of July - Final session (summer session)**



Qualifying session January-February

- About 400 participants from 100 teams
- Lectures, master classes
- Workshops in the laboratories of the INP and the Faculty of Physics of Moscow State University
- Excursions at RSC ENERGY, IKI RAN, NPO them. S.A. Lavochkina, MAI, Memorial Museum of Cosmonautics
- Projects DEFENCE



The traditional closure of the school in the "RSC" ENERGY name S.P.Koroleva " and "Cosmos"



Summer session first week of July

- About 260 participants from 68 teams
- Lectures, master classes
- Excursions at Roscosmos manufactory
- Rocket launches
- Projects DEFENCES



At the Taldom Launch Site 2015.



At the Kameshkovo Launch Site 2019.



24-hour hard work



«14 minutes to start»



Ready to receive telemetry!



2014 – 2019



At an altitude of 800 it's hard to see Satellite



The same, but by radio



Now we need to find it.
Not all time successful.





FOUND !



International activity



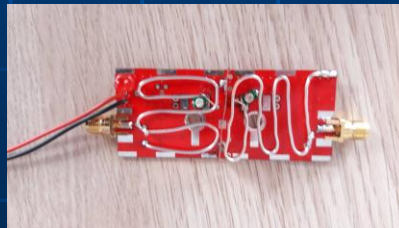
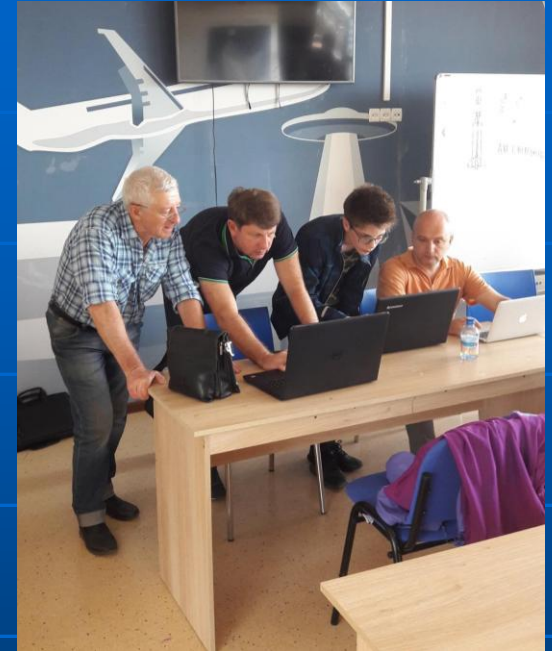




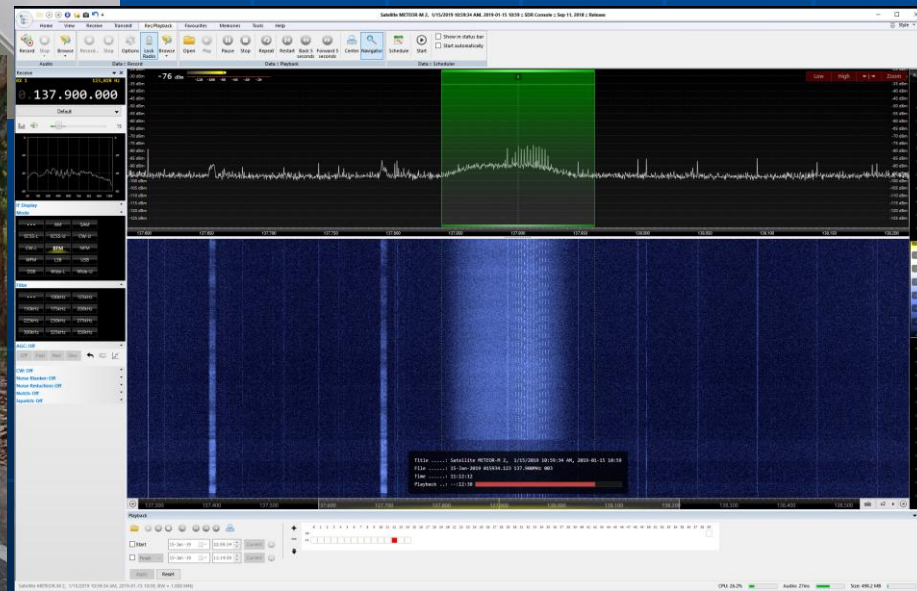
Yaroslavl 2017 receiving station



Artek 2018



Ground Station in Thailand



THANK YOU!

