

# Getting involved in real space projects with the student programme REXUS/BEXUS –

background, participation  
and opportunities



# REXUS and BEXUS – major education activity of SNSB

- German-Swedish programme in cooperation with ESA, established 2007
- Swedish share of the payload is made available to students from all ESA member states and cooperating states.
- Experiments can fly on a balloon or rocket next year
- More than 500 students have participated in the programme up to now



# Swedish National Space Board

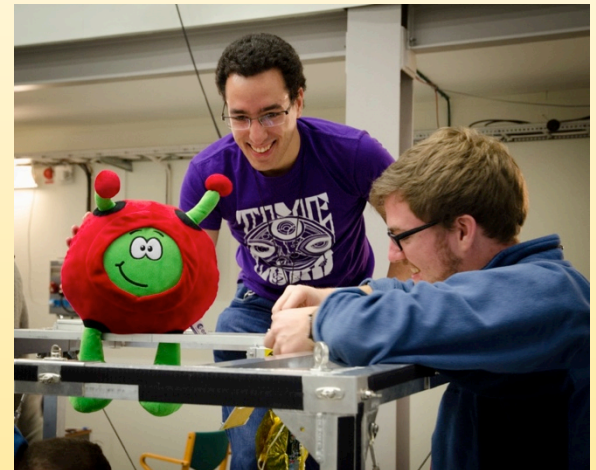
- Responsible for programme management together with DLR, and in cooperation with ESA
- Offers financial support to Swedish teams – up to 30 000 SEK for hardware and some travel support
- Places contract with SSC for operational support, management of launch campaigns etc ( 1/2 of the programme costs)





# Objectives of the REXUS/BEXUS Programme

- To promote interest into space technology and space science among students, young scientists and engineers
- To promote balloons and rockets as platforms for education, science and technology projects
- To promote Esrange as an attractive facility for rocket and balloon research
- To utilize and enhance the existing Swedish and German capacities within rocket and balloon technologies

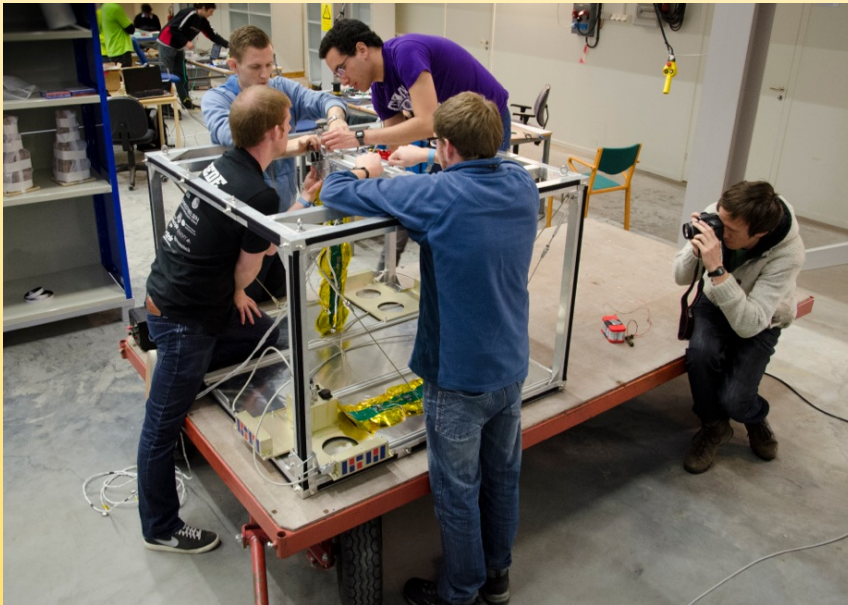






## 6 years of the REXUS/BEXUS Programme

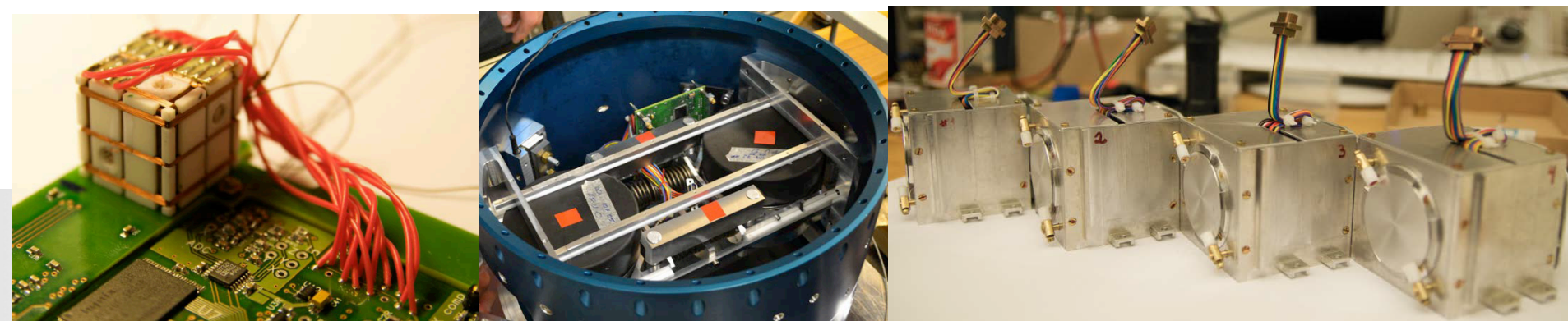
- > 500 students have been involved
- 10 rockets and 12 balloons have been launched
- ~ 80 experiments in total



# Participation of KTH in the Programme



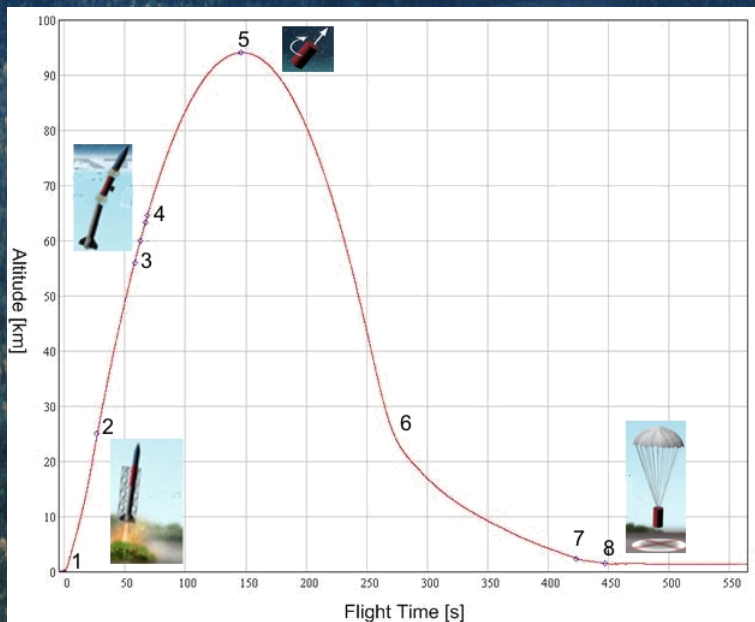
- Seven REXUS projects
- ~ 80 students
- 24 BSc theses and 9 MSc theses
- Experience from REXUS used in the SPIDER project



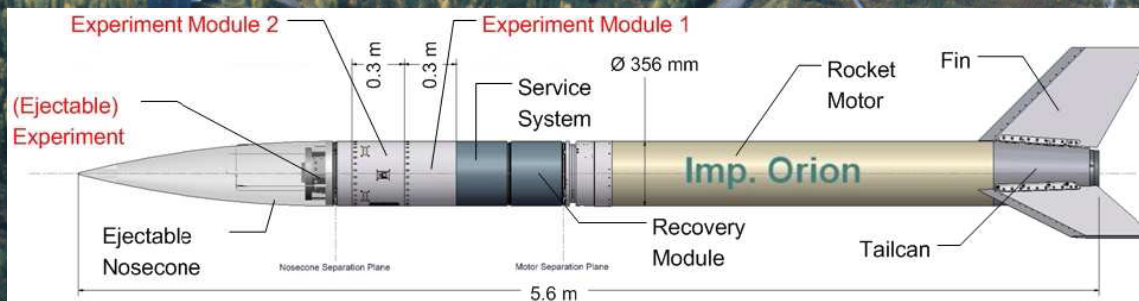


# REXUS

Two REXUS-rockets with student experiments are launched annually in Spring from Esrange. After a parachute landing the payloads are recovered; the experiments are returned to the students.



- Apogee: 75-90 km
- Payload: experiments max. 40 kg, system 60 kg
- Dimensions: length 5,6 m, diameter 35,6 cm
- Launch-Mass: 515 kg
- Rocket motor: Improved Orion
- Rocket spin: 4 Hz, on demand Yo-Yo
- Propellant: 290 kg of solid propellant
- Recovery: by Helicopter

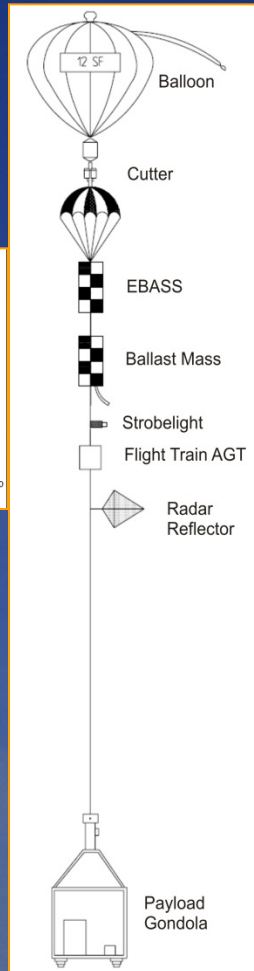
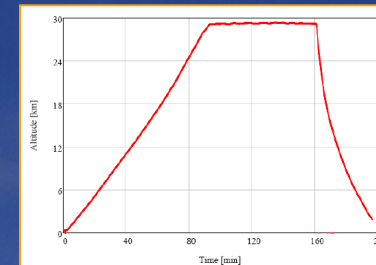




# BEXUS

Two BEXUS-Balloons are launched annually in Autumn from Esrange

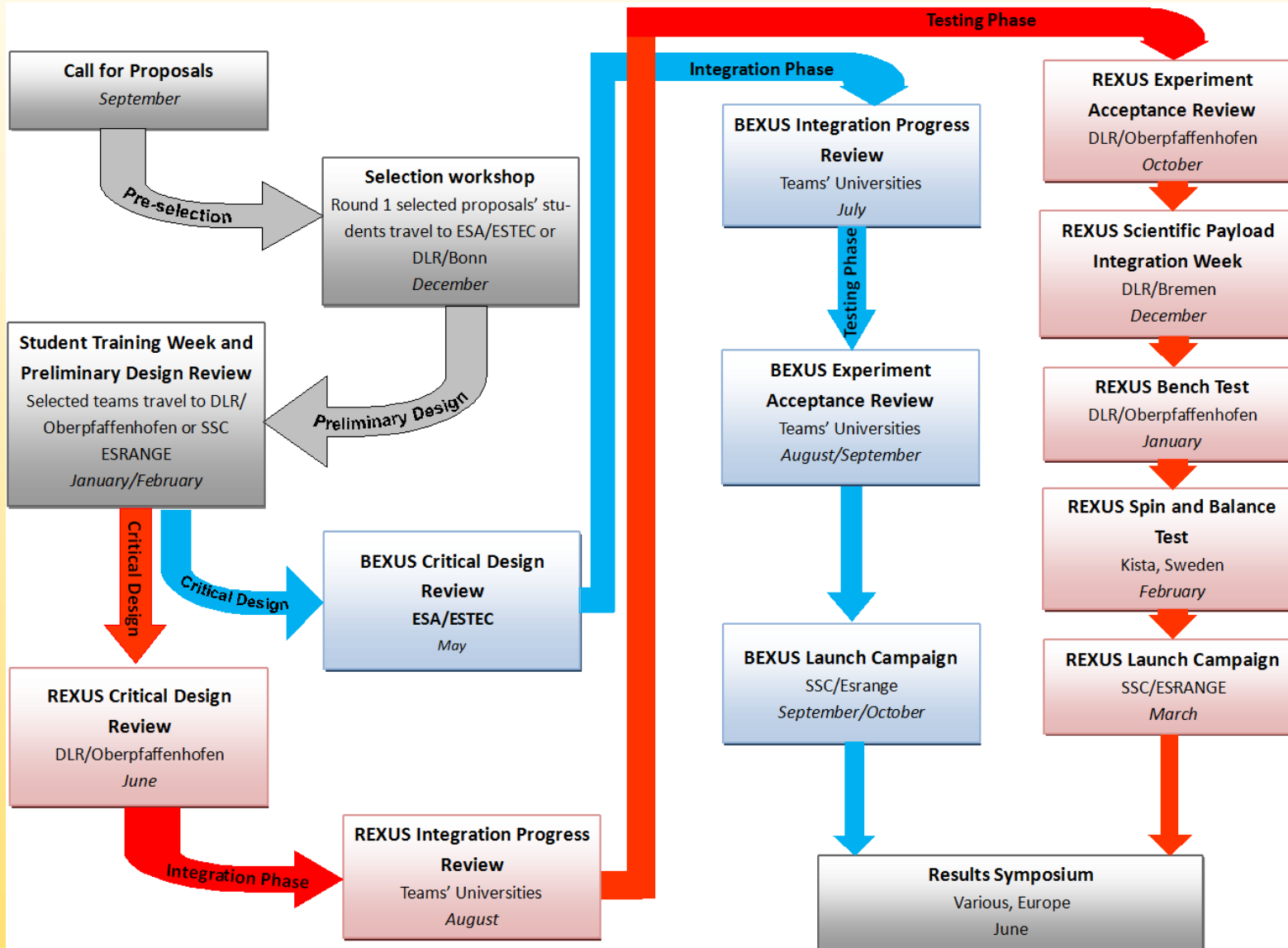
- Flight altitude: 25-30 km
- Flight duration: 2-5 hours
- Payload mass: 40/100 kg
- Balloon: 12,000 m<sup>3</sup> Zodiac 12 Plastic-Balloon, inflation with helium
- Total length of balloon system: 65-100 m
- Launch vehicle: 50 t "Hercules" with a 12 m crane
- Recovery: by helicopter







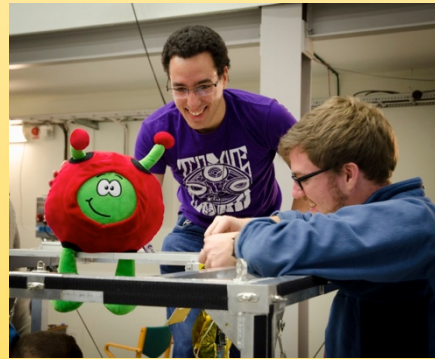
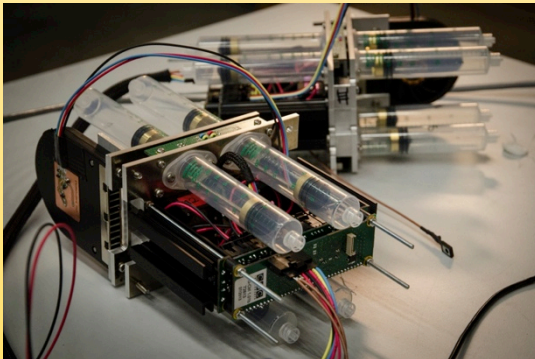
# Typical Programme Schedule





# REXUS/BEXUS Programme offers to students:

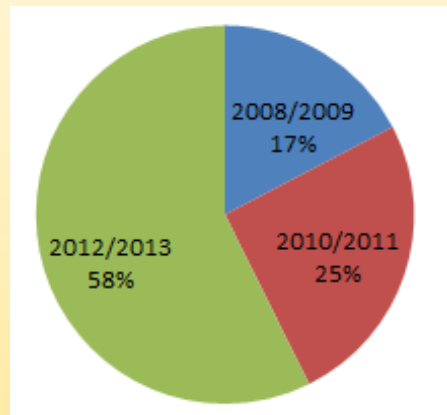
- A “flight ticket” to perform a science or technology experiment don a BEXUS balloon or a REXUS rocket
- Execution of a full life-cycle of a “space” project
- Contact with other European student teams and space organizations, team work, visit to ESTEC, Esrange, presentation(s) at conferences etc.
- Extraordinary opportunity for bachelor/master/diploma/doctoral thesis



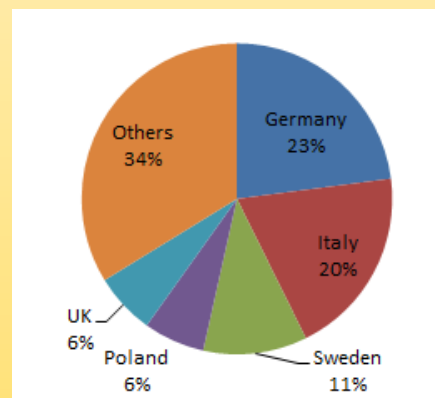


## Survey by ESA in 2013

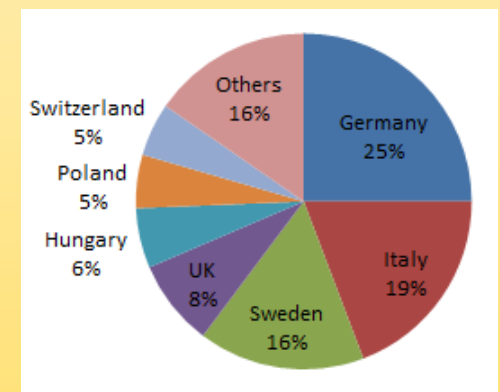
- **163** answers (16 % female, 84 % male)
- Students from all **20 vehicles**
- Year of launch



- Nationality



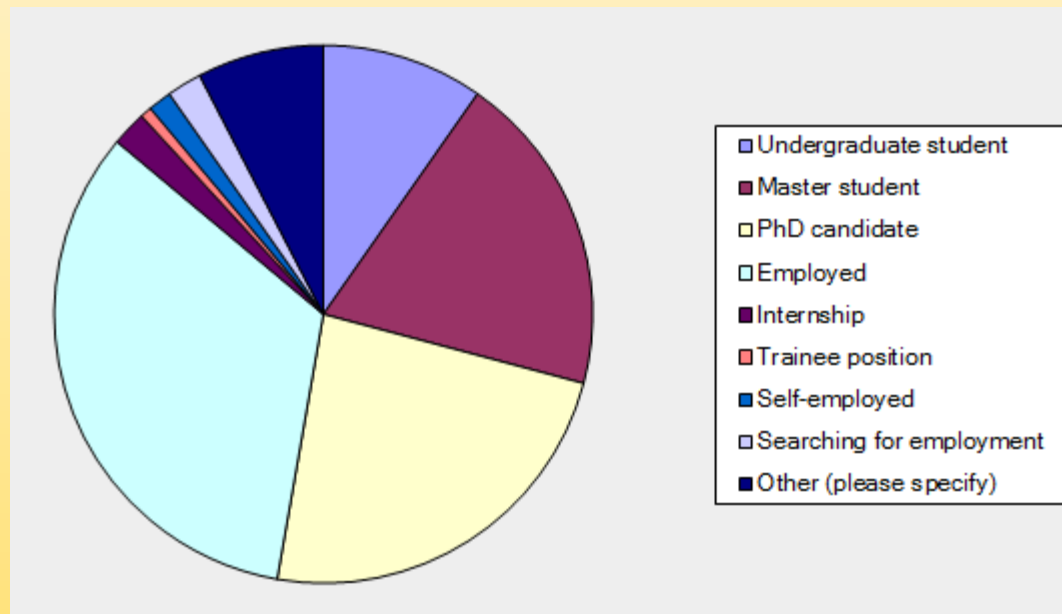
## Country of study





## Some statistics on the RX/BX students

- Course type : 63.4 % **Masters**, 19.7% PhD, 16.9 % Bachelors
- Course field: 52.7 % **Aerospace Engineering** but also Electrical Engineering, Mechanical Engineering, Physics, Computer Sciences, Project Management
- Part of their degree: **49 %**
- Delay of their course: **42.7 %**
- Completed their degree: **51 %**
- Type of occupation

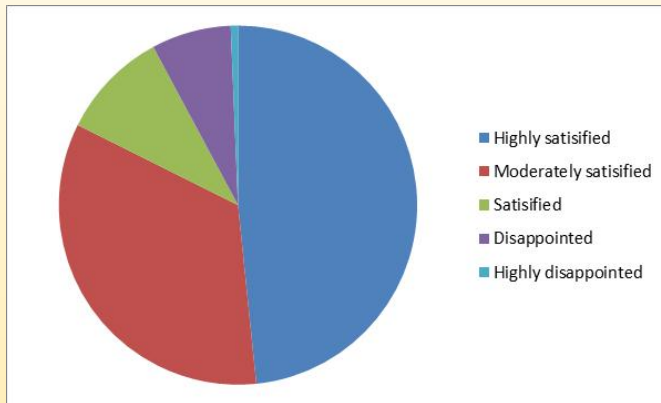






## Some results of the survey

- Level of satisfaction with the results of the project:



- Presented the project in conferences: **40.4 %**  
~1 or 2 conferences
- Contributed to conference papers: **56.8 %**  
~1 to 3 papers
- Published in scientific/technology journals: **17.2 %** (37.2 % planning to)  
~1 or 2 papers
- REXUS/BEXUS increased their interest in pursuing a space-related career: **88.2 %**
- REXUS/BEXUS was relevant to their career: **83.3 %**
- REXUS/BEXUS was a springboard for their career: **38.8 %** (43.3 % not yet)
- Current employment is space related: **64.2 %**



## What was the best thing about REXUS/BEXUS?

“Being able to take part in a space mission from end-to-end including concepts, design, building, testing and evaluation, flight and post flight data evaluation.”

“The fact that you are involved in an European project; that you have to interact with foreign people and that you have to apply what you have studied.”

“Contact with actual space programme and experts, and contact with fellow students in the area of study.”

“I could not name one thing that was the best, because everything was absolutely great about it. All the things we have learnt, all the experience, the new skills, cooperation and relation.”

“Have a goal, work hard and have fun.”



Thanks for listening!  
Movie time 😊

