



EUROPEAN SPACE CAMP
ANNUAL REPORT 2019

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OVERVIEW

Globally, there's a growing demand for satellites, space-technology and launchers, and the space industry is growing. Not only is European Space Camp located at a rocket launch facility, but it is also located at Andøya Space Center; an ambitious rocket launch facility, planning to expand to become Europe's only Spaceport capable of launching small satellites into orbit. As a result of ASC's ambitious plans to also expand their educational facilities, there was some construction work on the space center, and some areas and facilities we normally use were restricted this year. Although some might see this as negative, the added excitement of being part of a growing and evolving space center, soon to be spaceport, far outweighs the negatives in my opinion.

Just like ASC, Team Space Camp are always looking to evolve and grow, and with our new website, updated graphic profile and updated document templates for internal and external use, we consider our major efforts to modernize over for now. Our next move is developing an online pre-course integrated within our website, aimed at preparing the participants for the academic content at camp such as programming and rocket physics. More importantly, it will also make sure that everyone starts off with the same base-knowledge, allowing the academic content to be more of a deep dive into the rocket physics and research done at ASC, and less of an introduction to the basics.

This year we also had the honour of welcoming Russian Cosmonaut Andrey Borisenko, who held a lecture on his experiences from his time spent on the ISS. His willingness to talk with participants during meals and spare time as well as joining in on activities during camp contributed to many great conversations, cultural exchanges and opportunities

to ask questions in a casual setting with a former commander of the ISS, proved to be an invaluable asset at this year's camp. Additionally, we had visitors from the ZINØ science centres in Latvia, looking to observe and learn from us to help them establish their own space camp. Next year we are planning to have 2 Latvian participants, furthering our identity as an international camp with Nordic roots, and we are excited for what our cooperation may bring in the future. Combined with our guest lectures from the National Space Center in the UK, K-Sat, Norwegian Space Center and the staff at ASC and NAROM, this year's camp brought together a wealth of knowledge, passion and excitement for space that created an amazing and unique atmosphere.

It is truly the people at ESC that makes it so great, and when you combine the mentioned above lecturers and staff with some of the most talented and passionate students in Norway, Europe and globally, it really can't get much better. ESC is a unique experience unlike anything else, and although it requires a monumental effort and leaves everyone exhausted after camp, it inspires me and motivates me like nothing else. I would hereby like to thank the members of Team Space Camp and the organizers at NAROM, our scholarship organisations, our sponsors and all volunteer contributors for making ESC possible. I'm very thankful for the opportunity to be a part of this, and I am very excited for ESC 2020! And always remember - the sky is not the limit, it's where the fun begins.

Gaute Holen
Head of Team Space Camp



ORGANISERS

European Space Camp was first organised in 1996. It started out as a Nordic camp, but quickly evolved into an international event, with participants having represented 33 countries and 6 continents. The camp's primary purpose has always been to promote science, both as a field of study and a line of work. To achieve this we focus on three things: theory, practice and social activities. Many of our previous participants go on to study science, engineering and medicine. European Space Camp is organised by the organisation European Space Camp and the Norwegian Centre for Space-related Education in co-operation with Andøya Space Center and the Norwegian Space Centre.

European Space Camp

European Space Camp, formerly known as Forbundet Unge Forskere (Norwegian Association of Young Scientists), is the organisation responsible for the overall planning of the camp. European Space Camp is a non-profit organisation that works to promote interest in science among young people.



**EUROPEAN
SPACE CAMP**

National Centre for Space-related Education (NAROM)

NAROM is a subsidiary of Andøya Space Center. Its main purpose is to increase national recruitment to space-related subjects. Its role is becoming increasingly relevant in Norway, where the space industry is steadily growing and in need of fresh talent. NAROM initiates, develops and organises several educational courses and events for youths, students and teachers. Its main responsibility in organising European Space Camp is to handle the scientific and academic part of the camp.



NAROM | ANDØYA SPACE CENTER

Andøya Space Center (ASC)

Andøya Space Center is located at Andøya in northern Norway, and is the northernmost permanent rocket range in the world with decades of experience in launching sounding rockets for atmospheric research. ASC supports sounding rockets and balloon operations both at Andøya and Svalbard. The space center also has advanced facilities for ground based scientific experiments using LIDARs and radars.



ANDØYA SPACE CENTER



TEAM SPACE CAMP

Team Space Camp in cooperation with NAROM is responsible for the overall planning of the camp and consists exclusively of past participants of ESC. By selecting previous participants we ensure steady recruitment as well as creating a team of motivated people who understand how the camp functions and how it can be further developed and improved. The entire team works together on a voluntary basis to organise each year's camp.



The Team of 2019: Anne Svindland Nijdam, Anders Mørk, Tiia Tikkala, Gaute Holen, Nina Marie Thomsen and Inge Eide Johnsen.

The team's main responsibilities include: sourcing sponsors, managing the camp's finances, selecting high calibre participants, organising exciting social activities during the camp, maintaining our website, managing public relations, recruiting new team members and, of course, ensuring that each camp runs smoothly and is an enjoyable experience for every participant.

The members of Team Space Camp are all students of science and technology and work on European Space Camp in their spare time throughout the year. The Team gathers twice a year for workshops over a couple of days, where they prepare for the upcoming camp and share inspiration and creativity to make every camp as successful as possible.

Team Space Camp 2019 consisted of Gaute Holen (head), Nina Marie Thomsen, Tiia Tikkala, Inge Eide Johnsen, Anders Mørk and Anne Svindland Nijdam. The team is delighted to welcome Lucia Carai as our new trainee for Team Space Camp 2020.



PARTICIPANTS



European Space Camp 2019 gathered 22 participants with common interests in science, space and technology from 9 countries around the world: Germany, Poland, Norway, Switzerland, Sweden, New Zealand, Russia, USA and Italy. In the picture above, the participants are gathered together with cosmonaut, Andrei Borisenko



Astrid Sol Naess
Norway



Finn Stokes
New Zealand



Ellen Hammarstedt
Sweden



Natalie Johannessen
Norway



Magnus Haakonsen
Norway



Anna Krajewski
Germany



Marco Cipriani
Italy



Lucia Carai
Germany



Katarzyna Dylewska
Poland



Florian Schmetzke
Germany



Hans Gunnar Grayston
Norway



Mathias Tong
Norway



Stefan Rucki
Poland



Vilde Hvam
Norway



Emil Islamov
Russia



Ethan Dias
Norway



Charles Snow Gillingham
New Zealand



Moriz Berclaz
Switzerland



Hope Fu
USA



Marcus Johan de Boer
Norway



Azat Valeev
Russia



Helena Lehtiniemi
Norway

FINANCING

| FINANCING(in NOK) | Financial Support | Other ⁽¹⁾ | Total Support |
|---|-------------------|----------------------|------------------|
| Andøy municipality | 5,000 | 0 | 5,000 |
| Andøya Rocket Range rocket campaign reduced fee | 24,287 | 0 | 24,287 |
| Kongsberg Defence and Surveillance | 50,000 | 0 | 50,000 |
| Scholarship fees | 272,909 | 0 | 272,909 |
| Norwegian Space Centre | 110,000 | 0 | 110,000 |
| NAROM | 3,500 | 250,000 | 253,500 |
| Team ESC ⁽²⁾ | 0 | 525,000 | 525,000 |
| The Arctic University of Norway (UiT) | 15,000 | 0 | 15,000 |
| GARD | 10,000 | 0 | 10,000 |
| Tekna | 10,000 | 0 | 10,000 |
| Kongsberg Satellite Services | 10,000 | 0 | 10,000 |
| NAMMO | 15,000 | 0 | 15,000 |
| Klett Und Balmer ⁽³⁾ | 1,444 | 0 | 1,444 |
| ESC contingency fund ⁽⁴⁾ | 47,523 | 0 | 47,523 |
| Banking interest | 373 | 0 | 373 |
| SUM FINANCING | 575,036 | 775,000 | 1,350,036 |

⁽¹⁾ By other support, we mean support that we receive in the form of free services or services at a reduced fee.

⁽²⁾ Team European Space Camp contributed with approximately 3500 hours valued at NOK 150 per hour.

⁽³⁾ Payment for use and licensing of ESC materials in educational materials

⁽⁴⁾ The transfer from the Contingency Fund was a decision the Team found necessary for future economy and new scholarship agreements.

EXPENSES

| EXPENSES(in NOK) | Budget 2019 | Accounting 2019 |
|--|----------------|-----------------|
| Course materials | 4 200 | 4,100 |
| Balloon operation (balloon, payload, operation) | 5 100 | 5,100 |
| Rocket campaign (rocket, payload, safety notifications, operation) | 136 963 | 143,963 |
| Lodging and all meals for students, lecturers and Team | 230 930 | 236,075 |
| Travel expenses, lecturers and group leaders | 25 000 | 19,209 |
| Transportation at Andøya (students and team) | 15 000 | 12,177 |
| External lecturers | 17 500 | 17,003 |
| Scientific assistance | 15 440 | 15,144 |
| Other expenses NAROM (unforeseen expenses, social events, insurance) | 54 708 | 35,261 |
| European Space Camp jackets | 20 000 | 29,085 |
| Equipment | 1 000 | 0 |
| Team expenses | 5 000 | 6,411 |
| Travel expenses, Team | 55 000 | 46,926 |
| Office expenses (Internet connection, stationary, bank fees, Space Camp DVDs and annual reports) | 3 500 | 3,874 |
| Postage | 1 500 | 0 |
| Marketing | 1 000 | 0 |
| Other expenses Team (including unforeseen expenses) | 1 500 | 708 |
| SUM EXPENSES | 593 341 | 575,036 |

BUDGET

| EXPENSES | Budget 2020 (in NOK) |
|--|----------------------|
| Course materials | kr 4,200 |
| Balloon operation (balloon, payload, operation) | kr 5,100 |
| Rocket campaign (rocket, payload, safety notifications, operation) | kr 179,475 |
| Lodging and all meals for students, lecturers and Team | kr 234,500 |
| Travel expenses, lecturers and group leaders | kr 10,000 |
| Transportation at Andøya (students and team) | kr 13,500 |
| External lecturers | kr 17,500 |
| Support for education activities | kr 15,706 |
| Other expenses NAROM (unforeseen expenses, social events, insurance, whale safari) | kr 42,262 |
| ESC jackets | kr 25,000 |
| Equipment | kr 500 |
| Team expenses | kr 5,000 |
| Travel expenses, Team | kr 45,000 |
| Office expenses | kr 3,000 |
| Postage | kr 1,500 |
| Marketing | kr 1,000 |
| Other expenses Team | kr 1,000 |
| SUM | kr 604,243 |

European Space Camp (ESC) is a nonprofit organisation, with the aim of organising and running European Space Camp each year within budget. Any leftover funds are collected in a contingency fund and reserved for future camps in case of a shortfall in funding or unexpected extra costs.

European Space Camp 2019 was not conducted completely as per the budget, which caused a deficit of NOK 47 523. The activities leading to the increased costs will be reconsidered for the following camps.

There were several unexpected cost additions to European Space Camp 2019 compared to previous camps such as the increased cost of the rocket campaign and travel costs for lecturers and group leaders.

Part of the deficit was caused by the unexpected loss of sponsorship revenue compared to previous years. This demonstrates the importance of all of the sponsors and scholarship agreements we currently have. With the cost of European Space Camp increasing year on year, controlling costs and protecting sponsorship revenues is of prime importance for Team Space Camp.

Looking forward to ESC 2020, we are seeking to further diversify sponsorship into Europe and internationally. We are extremely grateful to our current sponsors, scholarship organisations and collaborating partners. Their continual support of the work and vision of European Space Camp has been crucial to the ongoing success and growing reputation of ESC.

EVALUATION

European Space Camp 2019 was a great success, as shown by the strong positive feedback in the evaluation completed by the participants at the end of the camp. The positive feedback extended to every part of the camp, including the quality and content of lectures, the variety of activities and the stay at Andøya Space Centre, including the accommodation, food and location.

| Criteria | Average Percentage Rated 'Good' & 'Excellent' |
|--------------------------|---|
| Professional Content | 93 |
| Pedagogical Presentation | 81 |
| Relevance to the Course | 87 |

Lectures and lecturers were evaluated on the criteria of professional content, pedagogical presentation and relevance to the course, with the average percentage of 'good' and 'excellent' ratings across all lectures above 80% for every criterion.

Some comments made by participants were:

"Christoffer has a wide knowledge about rocket physics and he should share that with others."

"I really enjoyed these lectures as I did not have a lot of background knowledge on aurora science and, therefore, learned a lot of new information."

"Sophie is amazing! She makes the lectures super exciting and engaging and the follow up learning she does in small groups after is really appreciated"

"Awesomeness combine with more awesomeness!"

"Very intriguing topic, loved it"

"Perfection with connecting nerdy stuff with actual science!"

| Activities | Average Percentage Rated 'Good' & 'Excellent' |
|------------------------|---|
| Opening Ceremony | 77 |
| ALOMAR Tour | 82 |
| GPS Quest | 100 |
| Engineering Challenges | 95 |
| Social Activities | 83 |

Participants continue to enjoy the informative, social and educational activities organised for them as demonstrated by their ratings and comments;

"I absolutely loved the trip and also nice to see how they were working on the top!"

"That was a great adventure!"

"This was super fun and actually some of the best experiences at the camp."

"The ten degrees of Norwegian Sea are unforgettable!"

"Great fun even though dancing is not my field of expertise."

| Category | Average Percentage Rated 'Good' & 'Excellent' |
|------------------|---|
| Location of camp | 96 |
| Accommodation | 95 |
| Team | 100 |
| General | 96 |

Participants' assessment of the camp over all strongly endorsed ESC, again displayed through their ratings and comments;

"I think the location was really great! Living in the center is a great way of being immersed in the activities of the center and the landscape is very beautiful."

"I really enjoyed my stay here at ASC. I think the team did a great job organising everything and made sure that we are there on time so that we never really had any delays."

"Honestly the ESC team were amazing, from as soon as we arrived they were friendly, inviting and made conversation I guess I felt pretty comfortable very quickly"

"ESC was a great chance to meet people who are interested in the same sort of stuff and learn more about rocket science. We got to launch an actual rocket and evaluate the data by ourselves!"

"It is cool opportunity to feel yourself as professional worker of space center and to launch the real rocket."

"Everything was great! The people, activities, length. I have made friends and memories for life that I will always bear with me"

As shown by the evaluation, the overall feedback from the participants was extremely positive. The comments and data suggest that despite a small minority of participants having criticism of isolated aspects of the camp, practically all participants rated the camp "excellent" overall. Team Space Camp will be analysing the results from the evaluation to identify areas of improvement, making European Space Camp 2020 and beyond even greater experiences based on the success of previous camps.

SCHOLARSHIPS



Hordaland County



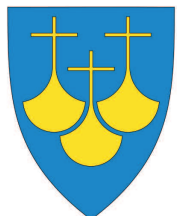
Rogaland County



Troms County



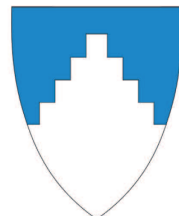
Nordland County



Møre og Romsdal County



Noosphera



Akershus County

SPONSORS



KONGSBERG



Andøy Municipality

MEMOIRS

Theresa Carai | Participant 2019

Every time I think of the week I got to spend at Andøya Space Centre a big smile appears on my face. Each day was packed with exciting activities from morning till evening. Fascinating lectures, the breathtaking scenery, a rocket launch and the most amazing people to experience it all with!



With cosmonaut Andrei Borisenko

I arrived at Andøya by plane and already got to meet some of the participants during the flight. Team space camp was waiting at the airport and impressed us by knowing all of our names before even meeting us. During our bus ride to the centre, we had the chance to admire the island's beautiful landscape and our excitement about what was to come was big!

The first full day at Andøya space centre began early and with some morning exercise (a daily ritual which became more and more creative with every day - including strict astronaut training and space-inspired charades). After breakfast, we were given a tour of the space centre to help us decide what roles we wanted to take up in the rocket launch preparations, with the three main groups being Sensor Experiments, Payload and Telemetry. We soon started working on these - with the majority of us soldering, programming and testing out sensors, and the payload group naming their circuit boards. The telemetry group was preparing their own mysterious project in the other building...

In between working on these tasks we got to listen to incredible lectures about space electronics, northern lights, rocket engines etc etc. as well as teach each other Russian and Italian card games, and eat waffles with jam and brown cheese, a Norwegian delicacy. Team Space Camp also made sure to keep our afternoons exciting with an alien-themed GPS-hunts and similar challenges.



Katarzyna, Marco and me about to drop our waterballoon in the engineering challenge

We also got the chance to hike up a mountain to the ALOMAR observatory for a super interesting tour and visit the Andenes whale museum. We had dinner with cosmonaut Andrej Borisenko who told us about what happens to tears in space and showed us exclusive videos from his space travels!

We were also visited by Sophie Cottis-Allan, from the British National Space Academy who brought us a lunar rock and an actual piece of the Hubble Space Telescope's solar array. She also demonstrated the heat shield of an actual Russian Buran shuttle with a gas torch and used her infrared camera to measure our body temperature after swimming in the arctic ocean.

A major highlight was, of course, launching our rocket ("Space Shipriani IV" named after our head of operations, Marco) with even Andrej joining in the celebrations.

Some other highlights included Marco's impromptu lecture about astrophotography and his self-made telescope as well as our evening bonfire, with stick bread and marshmallows. We stayed up all night playing midnight volleyball and swing dancing - perfectly wrapping up the unforgettable launch day.

The last day of space camp started with a late breakfast and us presenting the data from the launch - giving us the opportunity to hear from the different parts of the operation. Then we had the official closing of European Space Camp 2019 and rounded up the day with a sleepless night, some very hard goodbyes and a general consensus that everything had passed way too quickly. Luckily we left Andøya with new friends from all over the world, unforgettable memories and promises for a reunion.

