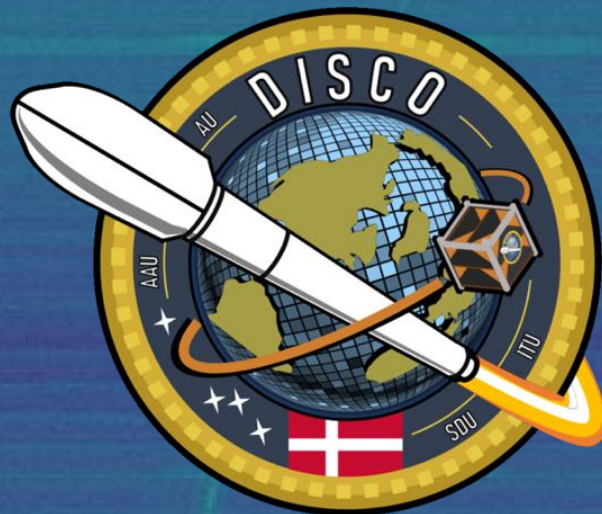


# DISCO SDU LOGBOOK 2022



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## Introduction

This logbook is a summary of all the events the SDU part of DISCO DanIsh Student Cubesat programme has been a part of during 2022. For all the events there is a short summary, and a picture if we remembered to take one at the event. For most of the activities there are links, which may or may not function in the future – depending on whether the URL's have been changed. We hope you find this logbook interesting and useful!

If you want an overview of all the activities, you can see it at page 15.

You can read more about DISCO at [discosat.dk](http://discosat.dk) [link](#)

If you have any questions, feel free to contact us.

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Thank you to all whom made this possible

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**OTTO MØNSTEDS FOND**

**THOMAS B. THRIGES FOND**



## **Rumkonferencen 2022, 24<sup>th</sup> March 2022, [link](#)**

### **Attendance from DISCO:**

Christoffer Karoff, Mads Mikkelsen, Mads Toudal Frandsen, Nicolai Iversen, and many other students from University of Aarhus

### **Summary:**

A great day it was when we among others meet with Andreas Mogensen. We attended the conference with open minds and were very pleased with the outcome.



## **Odense Havnekulturfestival, 27<sup>th</sup> - 29<sup>th</sup> May 2022, [link](#)**

### **Attendance from DISCO:**

Bertram Fjeldsø Eggertsen and Jacob Holzendorff Hafjall

### **Summary:**

We participated at Odense Havnekulturfestival where we had a stand to showcase our project. A big part of the festival was science, and we certainly meet some curious people who loved hearing about our project!

## **Radar Cross section measurement at SDU Sønderborg, 31<sup>th</sup> August 2022**

### **Attendance from DISCO:**

Abigail Levison, Jonas Mariager Jakobsen, Nikolaj Forskov Eriksen and Sigrud Gudrun Mulvad Samsing

### **Summary:**

A radar cross section of a model of the Disco 1 satellite was measured at SDU Sønderborg, this was to be used in calibration of space debris measuring radars, to be able to accurately find and classify previously unknown or lost pieces of debris.



## **Folkemødet Bornholm, 16<sup>th</sup> – 19<sup>th</sup> June 2022, [link](#)**

### **Attendance from DISCO:**

Mads Toudal Frandsen, Nicolai Iversen and Nikolaj Forskov Eriksen

### **Summary:**

Folkemødet is a big festival for politics, green ideas and much more. We attended the festival and gave talks about DISCO and hosted a workshop called “Build your own antenna”.



## Festival for Fremtiden, 25<sup>th</sup> and 26<sup>th</sup> August 2022, [link](#)

### Attendance:

Alexander Björn Kerff Nielsen, Lasse Thiellesen, Lucas Beck Røn Andersen, Mads Toudal Frandsen, Martin Wazar Eriksen, Mikkel Theiss Kristensen and Victor Johannes Larsen Rør

### Summary:

About 1600 kids and teenagers attended the festival to hear about climate, politics, technology and more. At our stand we talked about the DISCO project and introduced the interested to the mobile ground station. We saw a lot of smiling faces and got a lot of great questions from the youngsters!



## UngScience Konference, 30<sup>th</sup> - 31<sup>st</sup> August 2022, [link](#)

### Attendance:

Mads Toudal Frandsen

### Summary:

The DISCO project was presented to approximately 35 teachers from 50 different schools from all over Denmark by Mads Toudal Frandsen.



## Uddannelsesdebat med statsministeren, 9<sup>th</sup> September 2022, [link](#)

### Attendance

Frederik Johannes Harald Bernard Bay Lunding, Mads Jull Ahlebæk, Mads Toudal Frandsen and Nicolai Iversen

### Summary:

The Danish prime minister was attending a debate about education, but prior to the start of the debate, she stopped and showed interest in the DISCO antenna array that was being showcased near the SDU's main entrance. A short discussion started about space, student involvement and the interest both researchers and students have in space-related technology.



## RUMFYSIK – FYSIK I DET 21. ÅRHUNDREDE VEST, 29<sup>th</sup> September 2022, [link](#)

### Attendance:

Alexander Björn Kerff Nielsen, Lasse Thielsen, Lucas Beck Røn Andersen, Mads Toudal Frandsen and Nikolaj Forskov Eriksen

### Summary:

We presented our mobile ground station workshop for physics high school teachers from the western part of Denmark. This included showing how the mobile ground station works and explaining the format of the workshop we offer for high schools.

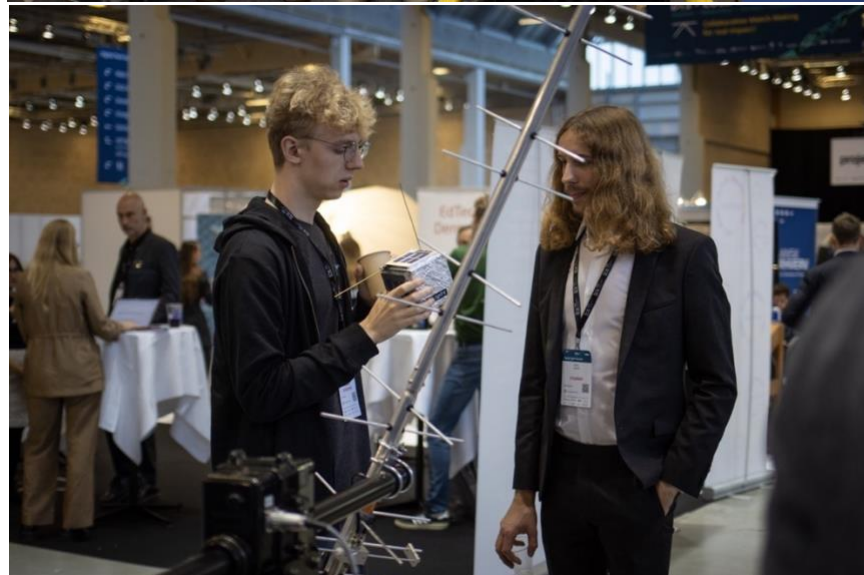
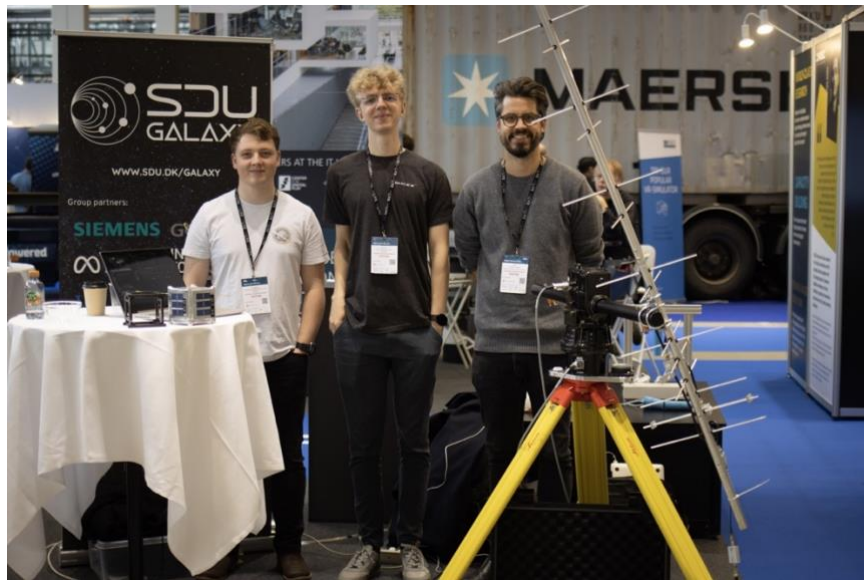
## Digital Tech Summit, 25<sup>th</sup> - 26<sup>th</sup> October 2022, [link](#)

### Attendance:

Frederik Johannes Harald Bernard Bay Lunding, Mads Toudal Frandsen and Victor Johannes Larsen Rør

### Summary:

DISCO had a stand at the summit to promote our project and SDU Galaxy. We met with a lot of people from different branches of the tech industry and got some new connections that we might collaborate with in the future. More than 5000 people attended the Digital Tech Summit and many of them came by our stand for a chat about CubeSats, satellite communication and more.



## Studiepraktik - i uge 43 2022 (Fysik), 27<sup>th</sup> October 2022, [link](#)

### Attendance from DISCO:

Alexander Björn Kerff Nielsen, Andrea Irollo and Frederik Johannes Harald Bernard Bay Lunding

### Summary:

We helped the Physics department of SDU by arranging and executing two workshops about CubeSats and satellite communication for a total of 30 high school students. They were all very excited about DISCO and those who wanted got a pdf that explains satellite communication in more detail.

## SDU Praktik - og Projektdag 2022, 1<sup>th</sup> November 2022, [link](#)

### Attendance from DISCO:

Alexander Björn Kerff Nielsen, Andrea Irollo, Claudio Piazzai, Jonas Mariager Jakobsen, Thomas Mastrup Hansen and Nikolaj Forskov Eriksen

### Summary:

We attended a day in the name of collaboration at SDU where 105 companies came to showcase projects and the possibility to connect with students. We had a stand besides [Vikings](#) another student project at SDU. We connected with other students and networked with companies. More than 1000 students from SDU attended the event.



## Amatør Træf Fyn – Odense, 6<sup>th</sup> November 2022, [link](#)

### Attendance from DISCO:

Alexander Björn Kerff Nielsen, Jonas Mariager Jakobsen, Nikolaj Forskov Eriksen and Thomas Mastrup Hansen

### Summary:

We had a stand where we talked with radio amateurs from the whole country. All of them were really interested in DISCO and many would even like to collaborate with us and share their great knowledge of radio communication! Thomas Mastrup Hansen got radio license A and Alexander Björn Kerff Nielsen got radio license D on the day by taking official radio tests. All in all, a great day and we look forward to going to other 'træfs'/meetups all over the country in the near future!



# Tingkærskolen - Sustainability and Technology, 9<sup>th</sup> November 2022, [link](#)

## Attendance from DISCO:

Alexander Björn Kerff Nielsen, Andrea Irollo, Claudio Piazzai and Martin Wazar Eriksen

## Summary:

We arranged and executed two workshops at a theme week at Tingkærskolen for about 20 pupils in total. The theme was *Sustainability and Technology*. Those two key words fit DISCO very well since we are experimenting with new technology and DISCO 2 is planned to observe how the ice is melting at east Greenland.



## Sct. Knuds Gymnasium, 14<sup>th</sup> November 2022, [link](#)

### Attendance from DISCO:

Alexander Björn Kerff Nielsen, Andrea Irollo, Fynn Dobrindt, and Lucas Beck Røn Andersen

### Summary:

DISCO's first workshop at a high school with 11 students studying A level physics. The workshop went very well, and the high school students showed great interest in the project. They had just started a new topic in their curriculum *Physics in space*, so the workshop was perfect timing. The physics teacher was very pleased with the workshop!





## **Fysiklæreforeningens Årskursus, 16<sup>th</sup> November 2022, [link](#)**

### **Attendance from DISCO:**

Alexander Björn Kerff Nielsen, Christoffer Karoff, Mads Mikkelsen and Mads Toudal Frandsen

### **Summary:**

We attended the annual workshop of Fysiklæreforeningen where Christoffer Karoff presented the DISCO project and the possibility to track satellites with mobile ground stations. The high school teachers were very impressed with the project. After the presentation we talked with the teachers about coming out to their high schools to do a workshop.

## **NAT Naturvidenskabens dag, 6<sup>th</sup> - 9<sup>th</sup> December 2022, [link](#)**

### **Attendance from DISCO:**

Alexander Björn Kerff Nielsen, Andrea Irollo, Emilia Sophie Genschow, Fynn Dobrindt, Guglielmo Borzone and Tobias Jørgensen

### **Summary:**

Over the span of three days approximately 170 students from high schools all around Denmark visited SDU. All the students had shortly before their visit chosen to study science at their high school. For three days in a row, we arranged and executed 4 workshops of 35 minutes each for the students. This way all the students got to experience the mobile ground station and hear about DISCO. We got great feedback and maybe we will see them at AAU, AU, ITU or SDU studying withing the STEM field in 3 years' time.





## Overview of 2022

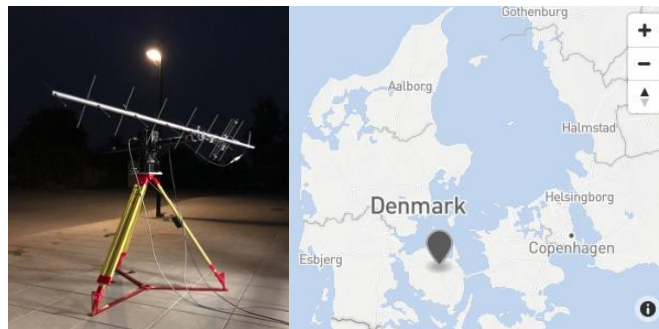
The mobile ground station workshops are highlighted with gray

Events/workshops and link	Date	DISCO members going out	Number of participants at the event
Rumkonferencen 2022, <a href="#">link</a>	24 March 2022	14	Approximately 200 participants
Odense Havnekulturfestival	27 – 29 May 2022	3	-
Folkemødet Bornholm, <a href="#">link</a>	16 – 19 June 2022	3	Approximately 60000 at the event
Festival for Fremtiden, <a href="#">link</a>	25 - 26 August 2022	7	1600 kids and teenagers
UngScience Konference, <a href="#">link</a>	30 – 31 August 2022	1	Approximately 50 teachers from 35 different schools
Radar Cross section measurement at SDU Sønderborg	31 August 2022	4	-
Uddannelsesdebat med statsministeren, <a href="#">link</a>	9 September 2022	3	Approximately 5000 students saw the antenna array
Rumfysik - Fysik I det 21. Århundrede Vest, <a href="#">link</a>	29 September 2022	5	Approximately 60 high school physics teachers
Digital Tech Summit, <a href="#">link</a>	25 and 26 October 2022	3	5000 tech enthusiasts
Studiepraktik - I uge 43, <a href="#">link</a>	27 October 2022	3	30 high school students
SDU Praktik- og projektdag, <a href="#">link</a>	1 November 2022	6	105 companies and approximately 1000 students from SDU
Amatør Træf Fyn – Odense, <a href="#">link</a>	6 November 2022	4	Approximately 500 radio enthusiasts
Tingkærskolen, <a href="#">link</a>	9 November 2022	3	30 pupils
Sct. Knuds Gymnasium, <a href="#">link</a>	14 November 2022	4	11 high school students
Fysiklæreforeningens Årskursus, <a href="#">link</a>	16 November 2022	4	Approximately 200 participants
NAT Naturvidenskabens Dag, <a href="#">link</a>	6 – 9 December 2022	6	170 high school students

# Short summaries of 2022 from the groups within DISCO

## Mobile Ground station

The Mobile Ground station is a central part of DISCO since all new members learn to operate it and then later go out to high schools. We have already been to Sct. Knuds Gymnasium and many events and have seen many amazed faces. In the coming year, we plan to visit many other high schools and get even better at making workshops!

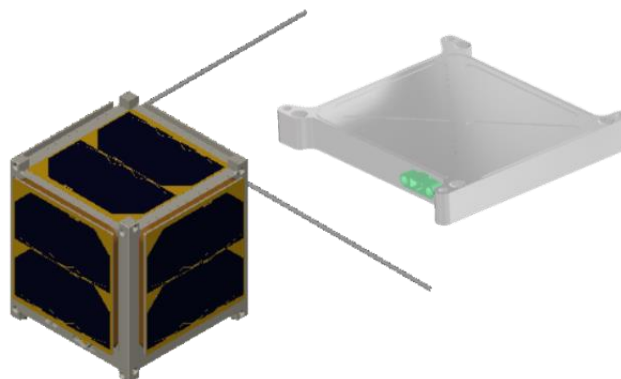


## SDR

The Software Defined Radio group has mostly focused on doing radio data transmission and has managed to do so using BPSK modulation. The second piece of work has been to implement real time, communication mechanisms for use in a complete piece of software able to do 2-way real time communication with our satellites. Of which a few have been worked on and implemented.

## Structure

In the structure group, there have been 3D printed models and mock-ups of the satellite. These models have been used to show in different contexts, at events, at high schools etc. It has also been used to make the radar cross-sections at SDU in Sønderborg in August. In addition, there are 3D printed models of enclosures from space Inventor, where the enclosure is adapted so that they can fit gecko connectors. There have been done work on the form factor, and there will be cooperation between the structure- and the flat sat team, to get some stuff into the cabinet. For posterity, we would like to be connected to, and collaborate with Aarhus University.



## **Flat Sat**

The initial goal of the flat sat group was to transmit FSK data using an off the shelf radio module along with an ARM based Tiva launchpad development board. The group has been able to achieve this goal using SPI to communicate with the radio module. As of now everything is in a repository at SDU Gitlab, and we are currently working on a guide to enable new group members to quickly come up to speed. Our current long-term goal is to create a custom PCB featuring the Tiva and a radio module with a form factor suitable for a CubeSat.

## **Control-room**

Through the second half of 2022, the control room group worked on the assembly and testing of the ground station infrastructure, prior to the final installation of the ground station at SDU Odense. With the ground station infrastructure being based on an internal Ubiquiti UniFi Software-Defined Network, the control-room team got to work with a lot of network equipment and what is possible when working with networked equipment and network solutions to IT problems.

## **Fonds and Business**

The role of this group is attract potential investors or partners in order to allow the development of DISCO. During the fall semester of 2022 we started a collaboration with another student driven group, called [JEESO](#), located in Sønderborg. With JESO we planned to realize a pitch for DISCO, to be presented to companies. For doing that we started by creating a more neat and sharp vision of our structure, the different groups, how many members and the respective projects. We also set off a journey to clarify what exactly is DISCO's mission and vision.

