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*”Avaruuden käyttö
on ihmiskunnan
tulevaisuus.*

*Se tarjoaa hyvin suuren
ja rikkaan joukon
mahdollisuuksia.”*

**Johan Silen:
Tähtien sota
s. 16**



SATSin jäseneksi voit liittyä täyttämällä jäsentietolomakkeen osoitteessa:

<http://www.sats-saff.fi>

ja maksamalla jäsenmaksun seuran tilille 218518-129232. Jäsenyys astuu voimaan kun jäsenmaksu on saapunut seuran tilille.

Suomen avaruustutkimusseura ry – Sällskapet för astronautisk forskning i Finland rf on 1959 perustettu yhdistys, jonka tarkoituksena on harjoittaa avaruusalan kokeilu-, harrastus-, tutkimus- ja tiedotustoimintaa sekä toimia avaruustutkimuksesta kiinnostuneiden henkilöiden yhdyssiteenä. Seura on Suomen äänivaltainen edustaja Kansainvälisessä astronautiikkaliitossa (IAF; International Astronautical Federation). Suomen avaruustutkimusseura julkaisee Avaruusluotain-lehteä ja ylläpitää kirjastoa, josta voi lainata alan kirjallisuutta, kuva- ja videomateriaalia. Seura järjestää avaruusaiheisia näyttelyitä ja tapahtumia sekä ylläpitää aihepiiriin liittyvää harrastustoimintaa.

Työ- ja kerhotila on osoitteessa Kauppalantie 6-8, 00320 HELSINKI (puh/vastaaja 09-5874433).

Vuoden 2008 jäsenmaksut (sisältää Avaruusluotain-lehden) ovat:

Varsinaiset jäsenet 17 €,

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Järjestö-/Yritysjäsenet 170 €

Päätoimittaja: Sini Merikallio, Ilmatieteen laitos / ILM, PL 503, 00101 HELSINKI

Puhelin: (09) 19294694 Fax: (09) 19294603

ISSN: 0356-021X – Ilmestymistään: neljä kertaa vuodessa – **Vuosikerran tilaushinta: 22 €**

Ilmoitushinnat: mustavalkosivu 300 € (puolikas 200 €), värisivu 600 € (puolikas 250 €), takakansi 700 € (puolikas 400 €)

Julkaisija: Suomen avaruustutkimusseura – Sällskapet för astronautisk forskning i Finland – Finnish Astronautical Society, <http://www.sats-saff.fi/>. Pankkiyhteys: Nordea 218518-129232

Vuoden 2008 lehden aineistopäivä on 15.10

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The first part of the Success Story of NISSE

by Gisela Baumann

NISSE may evoke for some of us a short Elf type fellow with a long beard and a red knitted cap. Norwegian farmers believe that if Nisse lives in their barns, they will be blessed. Therefore around Christmas when the NISSEs are active, they prepare food for them and, believe it or not, it's always eaten up by the next morning!

Some other readers may be familiar with the name NISSE because of the case of a Norwegian scientific satellite project, which was supposed to be launched in 1998. Set up to study the energy exchange in the upper layers of the atmosphere, the NISSE project involved all space physics groups in Norway at that time. The only sad thing is: The rocket has never been launched.

Consequently, we cannot learn a lesson from that, but we are going to live up to NISSE's great name with our own investigation: the **Nordic Ionospheric Sounding rocket Seeding Experiment**.

It all started with the substorm school in Iceland in November 2007: Three enthusiastic space physics students trying to hunt for auroras in the middle of nowhere at freezing minus degrees. A few months later the NISSE team came into being with 4 young students struggling with the tricky tasks of a space engineer.

After NISSE was chosen to participate in the REXUS rocket program, a joint project of ESA and the Swedish Space Corporation, the team was invited to a workshop at the beginning of March 2008 at the European Space Technology

and Research Centre (ESTEC) in Noordwijk, the Netherlands, to present their proposal to a panel of experts from ESA and Esrange, Kiruna, Sweden. Luckily, the presentation was on the second day, giving the team the possibility to spend nearly an all-nighter in polishing the slide show for the next day. After the presentation, the team was given the honour of having a short meeting with Prof. Gerhard Haerendel - one of the pioneers in ionospheric chemical release experiments. Valuable pieces of advice were given to us ("Do not use Barium, it is highly flammable and dangerous!"). The presentation was followed by about a thirty-minute long interview with the evaluation panel. That was the first ordeal. Obviously our knowledge of the practical aspect of space technology was still in its



Facts about the REXUS 6 sounding rocket:

- REXUS 6 is a similar rocket to REXUS 5, but without a parachute for recovery and despin. Vehicle: A one-stage rocket, an improved Orion rocket plus the payload.
- Spaceflight time: ~ three minutes
- Apogee: 95.8 km altitude
- Payload mass: ~100 kg
- Positioning system: GPS-position transmitted via telemetry stream
- Payload impact: After ~6min.
- Max. velocity before reaching apogee (BA): ~1250 m/s
- Max. acceleration (BA): ~18.5 g





spaceline (<http://www.virgingalactic.com/>), which will fly humans to about the same height as our REXUS rocket is going to reach.

A few weeks later we were informed, that NISSE had been given permission to have a total payload of 40 kg on a REXUS 6 sounding rocket, shared with only one other student team. The joy was immense, but we all knew that there was still a long way to go before we could let the corks pop.

ABOUT THE NISSE PROJECT IN SHORT

For the NISSE experiment 19 kg of water will be released from two water tanks into the ionosphere at an altitude of 95 km. The ejection system is based on two electrically triggered explosives below actuators operating a ball valve system. The ignition of the actuators is initiated by the on-board computer on REXUS 6. The liquid vanishes

due to solidification and evaporation, building up rapidly expanding vapour. Adiabatic cooling could further lead to condensation and formation of ice crystals that later on re-evaporate. The solar radiation and the ion chemistry ionize the water molecules, changing the chemical properties of the cloud.

The tristatic EISCAT UHF incoherent scatter radar system located in Northern Scandinavia (Tromsø, Norway, Kiruna, Sweden and Sodankylä, Finland) will be used to detect the effects of the water release on the ionospheric particle composition. The main task is to

find out how effectively the EISCAT UHF radar system can be used in active rocket chemical release experiments. To model the response of the ionosphere on the water release the Sodankylä Ion Chemistry (SIC) model will be used.

For further information on the NISSE project, visit NISSE's homepage:

<http://www.space.fmi.fi/NISSE/NISSEhomepage.html>

Read more about the scientific objectives of NISSE and the tank construction in the future editions of the Spaceprobe. □



NISSE team: Vidar Hølland, Gard Mellestrand, Timo Pitkänen and Gisela Baumann.

fledgling stages... But as we all know: Rohkea rokan syö (Fortune favours the brave).

Shortly after that there was a training week at the Esrange Space Centre in northern Sweden. The Swedish National Space Board, the German Space Agency as well as the European Space Agency ESA were present in the presentation sessions as well as in the evaluation panel of each of the 8 student teams. After a few more sleepless nights before the NISSE presentation, we finally convinced the board and were given the green light for our project to be carried on a REXUS sounding rocket. This time the teams were rewarded at the end of the training week with a presentation telling about the Virgin Galactic, the world's first

