SALACIA

SAline **L**iquids **A**nd **C**onductivity **I**n the **A**tmosphere
A REXUS project

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www.salacia.se

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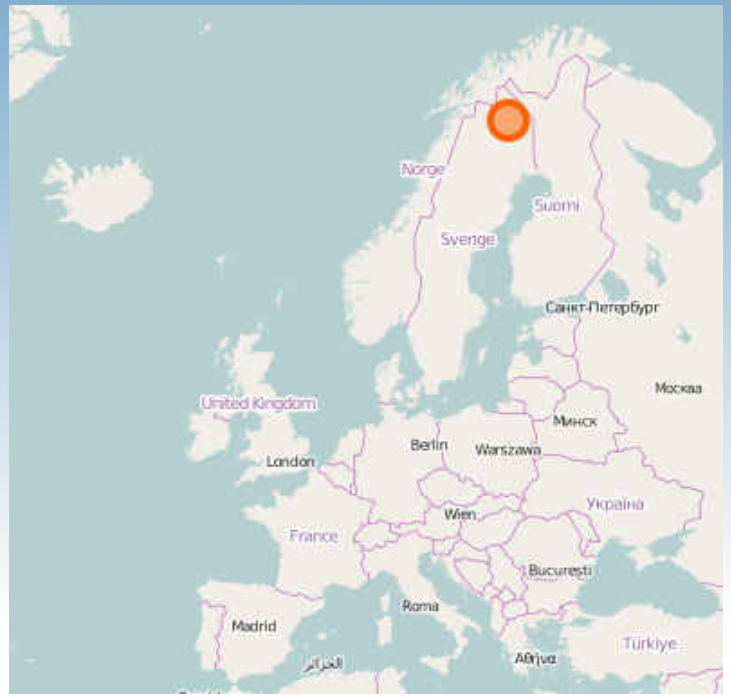
Outline

- The REXUS/BEXUS program
- Scientific background
- The SALACIA mission
- Discussion

The REXUS/BEXUS program

"The REXUS/BEXUS programme is realized under a bilateral Agency Agreement between the German Aerospace Center (DLR) and the Swedish National Space Board (SNSB). The Swedish share of the payload has been made available to students from other European countries through a collaboration with the European Space Agency (ESA)."[1]

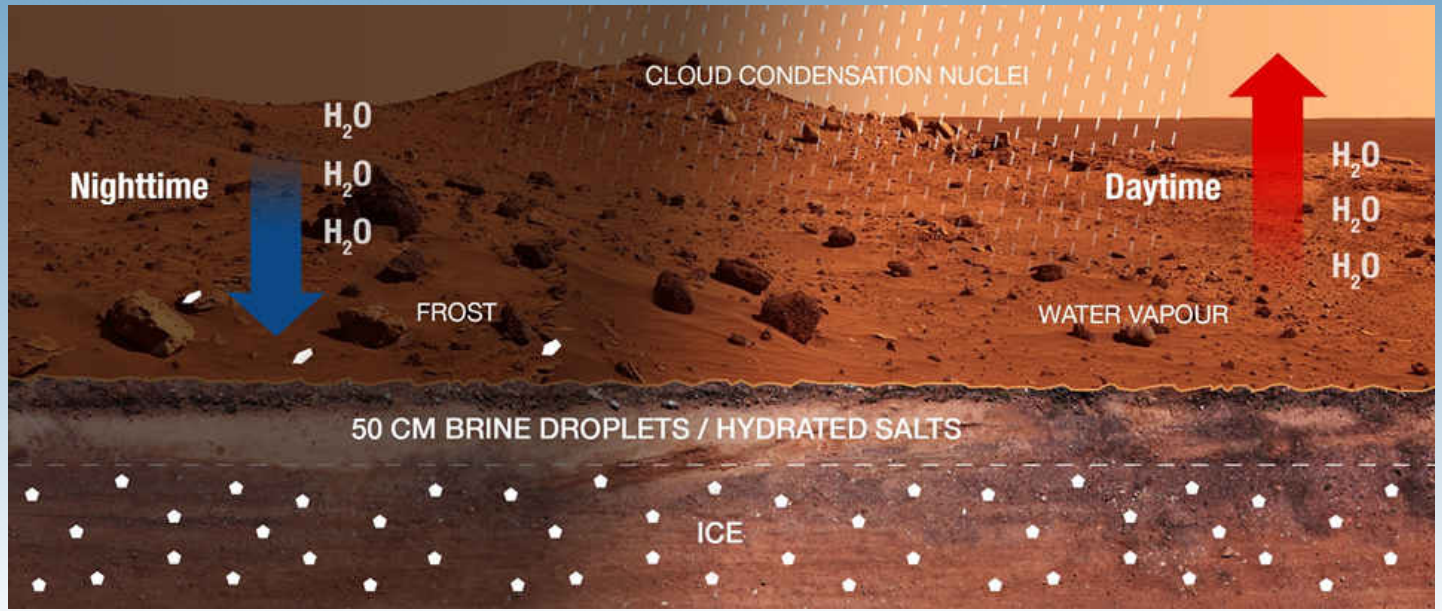


1. www.rexusbexus.net

REXUS timeline

- 18 m	- 15.5 m	- 15 m	- 8.5 m	- 4 m	+ 0
Call for proposals	ESTEC workshop	Final selection	Student Training Week	Integration week	Launch

Scientific Background



Credits: Martin-Torres & Zorzano

Scientific Background

Credits: Martin-Torres & Zorzano

time

The SALACIA mission

Salt behavior and conductivity

- under stress
- low pressure
- low Relative Humidities (RH)
- different temperatures

Designing an instrument to study perchlorates
(on Mars and Earth)

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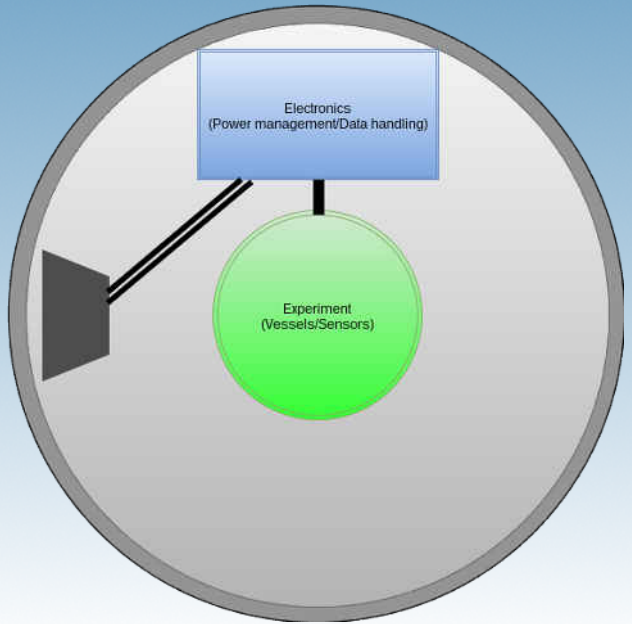
Experiment Design



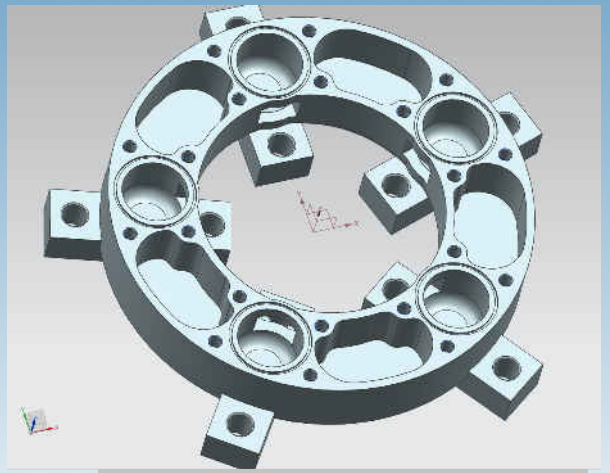
Layout view for SALACIA experiment

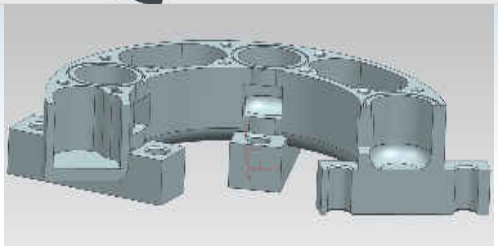
Mechanical structure

5 vessels, each have a volume of ~9000 mm^3

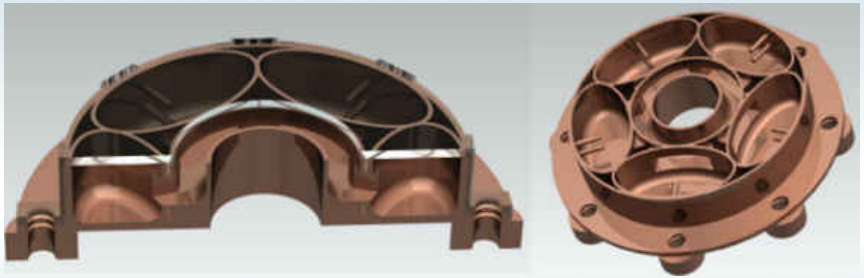
Cylindrical shape of the vessels (not yet determined), mass below 2kg

Take advantage of counterclockwise spin





Current preliminary design



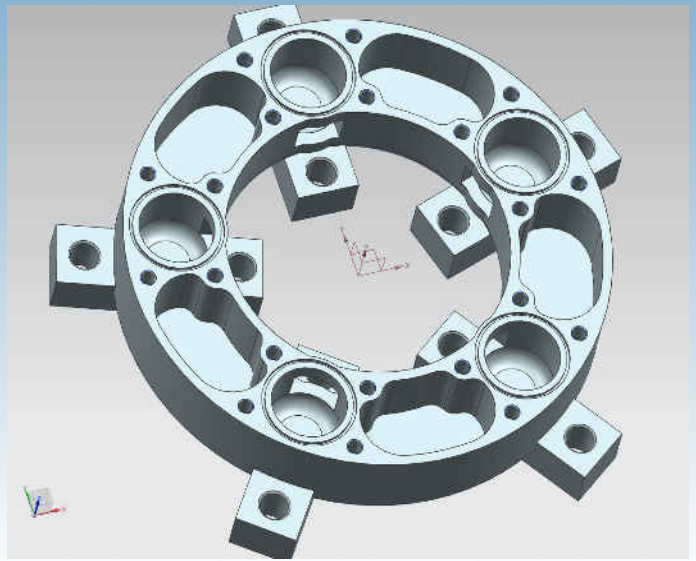
Old design

Electrical structure

- 1 microcontroller unit with a power consumption of about 20mA-50mA
- 1 power supply unit with an estimated power dissipation of ~37 mA
- Conductivity sensors are estimated to consume, at worst case ~200 mA
- Heating with power resistor of 100 Ohm, power consumption of 0.3 A, (10W)
- The total current drawn, with a 20% adding to the MCU and PSU, is estimated to be ~76 mAh (if the time of flight is ~800 seconds)
- The camera system will have its own battery

Expected results

Credits: Martin-Torres & Zorzano



The SALACIA Team

16 members

Studying space technology in Kiruna, Sweden

Supported by Luleå University of Technology

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Discussion

- Post-flight examination
- Conductivity measurements
- Oxidizing salts
- Laminar flow

Thank you !

Read more at:
www.salacia.se

Additional Slides

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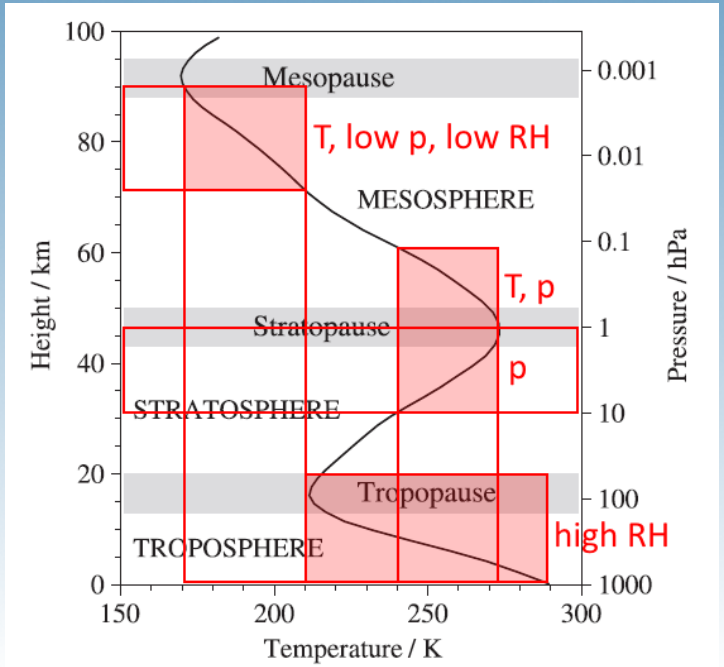
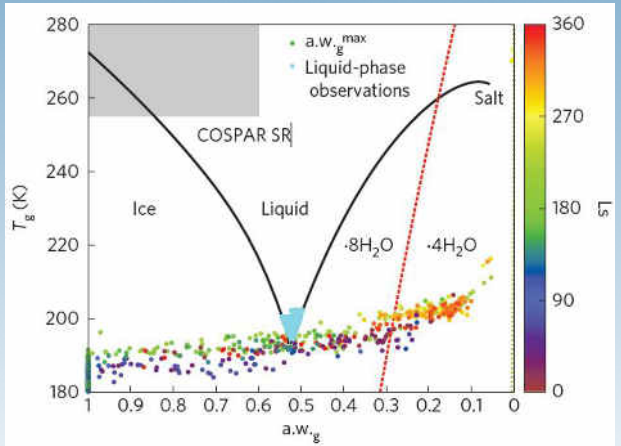
Motivation


Mesopause
T, low p, low RH
MESOSPHERE
T, p
Stratopause
p
STRATOSPHERE
Tropopause
high RH
TROPOSPHERE
Height / km
Pressure / hPa
Temperature / K
100
80
60
40
20
0
150
200
250
300
0.001
0.01
0.1
1
10
100
1000


a.w.$_g^{max}$
Liquid-phase observations
COSPAR SR
Salt
Ice
Liquid
·8H$_2$O
·4H$_2$O
T_g (K)
a.w.$_g$
LS
280
260
240
220
200
180
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
360
270
180
90
0