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|--|--|--|---|---|
|    | <b>REXUS/BEXUS</b><br>Experiment Acceptance<br>Review  | Experiment Team:   | CHAOS   |   |
|  |  | Vehicle and Flight number:   | BEXUS 34/35   |   |
| Location: ZARM, Bremen   |  | Date: 1 October 2024   |   |   |
|  Deutsches Zentrum<br>DLR für Luft- und Raumfahrt e.V.<br>in der Helmholtz-Gemeinschaft |  Rymdstyrelsen<br>Swedish National Space Agency |  |  |  |

### Review Board Members:

Torsten Lutz (ZARM)  
Steffen Calmer (ZARM)  
Florian Leu (ZARM)

### Experiment Team Members:

- Ava Pohley (TL)
- Hannes Ebeling (TL)
- Pierre Bornfleth

### Summary of Main Actions for the Experiment Team:

1. Revise the SED with a focus on the new mechanical interfaces and software filtering for shock noise.
2. Update checklists for preparations, flight, and recovery.

**Review Result:** pass / conditional pass / fail

Next SED version due 3months after launch campaign.

### 1 General

#### 1.1 Presentation

- Current status of the experiment, most important changes since IPR and thermal vacuum test results

#### 1.2 SED (editorial)

- document is complete and correct
- Minor editorial adjustments required

### 2 REQUIREMENTS AND CONSTRAINTS

- correctly identified and considered by the team.

### 3 PROJECT PLANNING

#### 3.1 WBS

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### 3.2 Schedule

- Flights and transfers are already booked and organized.

### 3.3 Resources

- Sufficient, including financial means for transport and accommodation.

### 3.4 Outreach

### 3.5 Risks

- All identified risks, including mechanical interfaces and functionality at low temperatures, have been mitigated.

## 4 EXPERIMENT

### 4.1 Mechanics

- Mechanical changes since the IPR include the omission of the original rubber bumpers, as the Styrofoam box itself provides sufficient shock absorption.
- New mechanical dimensions specified: 495x393x367 mm without rails, 600x393x374 mm with rails.

### 4.2 Electronics

- Over- and undervoltage tests were successfully conducted.

### 4.3 Thermal

- An independent thermal-vacuum test was conducted.
- Electronics remain functional even at temperatures below 0°C.
- The minimal leak rate was met.
- The system was flushed with nitrogen and will remain closed until after the campaign.

### 4.4 Software

- The experiment now uses only two computers: one for control and communication, and one for data logging.
- Each computer is capable of handling both communication control and data recording, providing a redundancy system.

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## 5 VERIFICATION AND TESTING

### 5.1 Verification Matrix

- Verification matrix is complete and covers all requirements.

### 5.2 Testplan

- Test plan is complete and includes the successful completion of vibration tests.

## 6 LAUNCH CAMPAIGN PREPARATION

- All preparations for the launch campaign have been made.
- Team is well-prepared and has clearly defined the procedures for the test days and the flight.

## 7 Thermal-Vacuum-Test Campaign

- Mass: 11.9 kg (below initial estimation)
- Dimensions: 495x393x367 mm without rails, 600x393x374 mm with rails
- Mechanical Interface: Rubber bumpers omitted; Styrofoam used for shock absorption
- Electrical Interfaces: Amphenol Power Supply connector, Ethernet connection.
- Check thermal cover: Checked and functional
- Results, see Annex A

## 8 Zarm Information




- The team is informed about the exact procedures of the campaign.
- Travel and accommodation are organized.

### Notes:

- Emil will oversee the tests related to the E-link.
- Connection and communication tests can be conducted on-site.
- Comparison measurements on the ground between Kiel and Kiruna are planned.

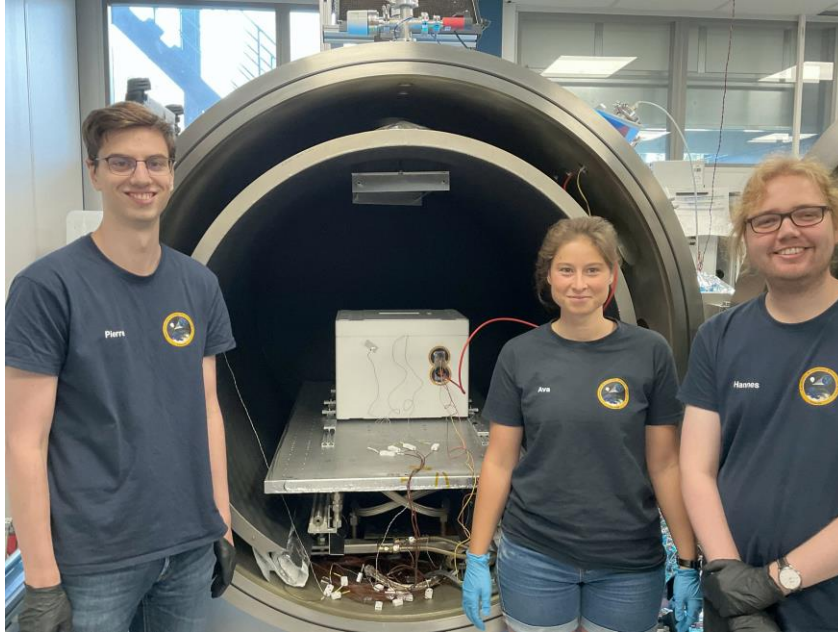
### Schedule for the Launch Campaign:

- Preparation during the first two days.
- Preliminary Flight Compatibility Test (FCT) on the 4th day.
- Launch is expected early in the morning, with a flight duration of approximately 3.5 - 5 hours.
- A brief presentation about the flight will be conducted on the following day.

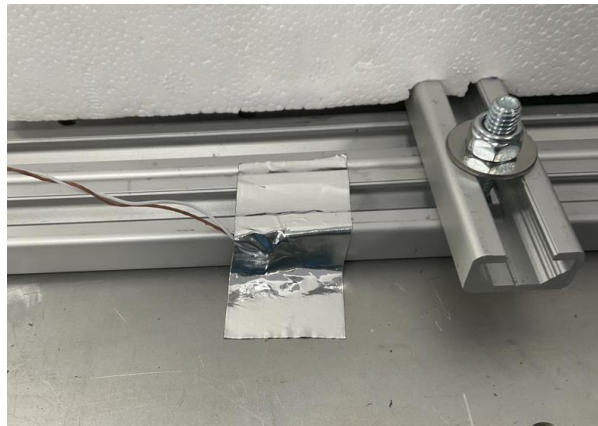
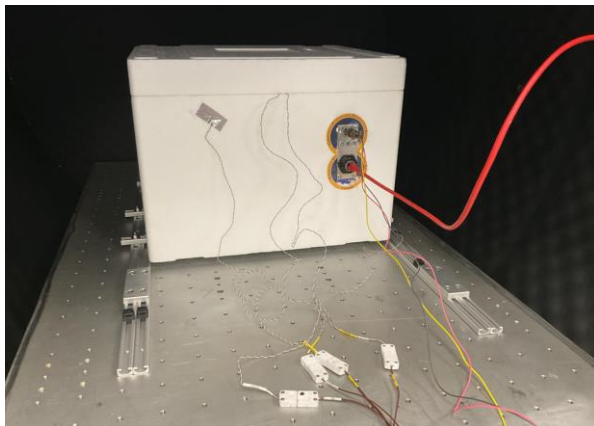
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## 9 Images

Team Picture:



Details of fixation:

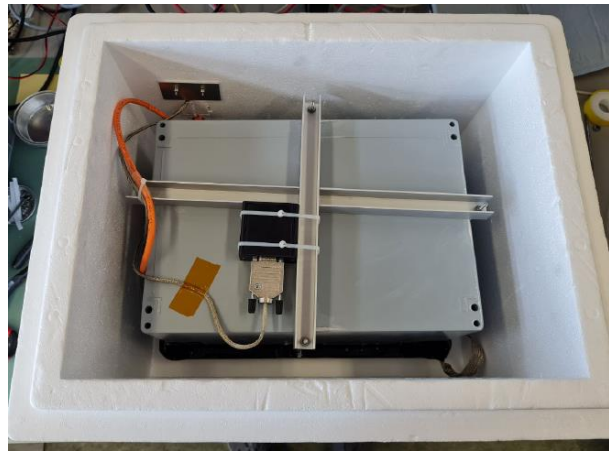






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|    |  |  |   |

Detail: Power plug – accessibility




Setup with insulation final look:



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## 10 Annex A: Thermal vacuum bake out Certificate of Conformance



|   |   |                                |
|---|---|--------------------------------|
|  | Thermal vacuum bake out<br>Certificate of Conformance | Doc. No.: BXS-CC-ZAR-ETC-CHAOS |
|   |   | Issue: 1                       |
|   |   | Date: 19-Sep-2024              |
|   |   | Page: 1 / 2                    |






### IDENTIFICATION:


|                           |   |
|---------------------------|---|
| <b>Customer</b>           | Bexus Campaign CHAOS                                    |
| <b>Item under test</b>    | CHAOS instrument in insulation box                      |
| <b>Test Specification</b> | Procedure: Thermal Vacuum Test BEXUS 34/35 <b>CHAOS</b> |
| <b>Date of Test</b>       | 02-Sep-2024   |
| <b>Type of Test</b>       | Thermal Vacuum Test                                     |
| <b>Test Facility</b>      | TVK 3200 at ZARM Technik                                |
| <b>Test Personnel</b>     | ZARM Technik: Bernd Carsten Sander<br>Marcel Vornholt   |

### CERTIFICATION:

ZARM Technik certifies that the test was conducted successfully according to the test specification stated above.

|              |  |
|--------------|--|
| Prepared by: | <br>Robin Kamermann<br>2024.09.19<br>18:10:27 +02'00'                             |
|              | R. Kamermann, Test Engineer  |
| Approved by: | <br>Digitally signed by Bernd Carsten Sander<br>Date: 2024.09.20 08:29:46 +02'00' |
|              | B. C. Sander, Test Engineer  |

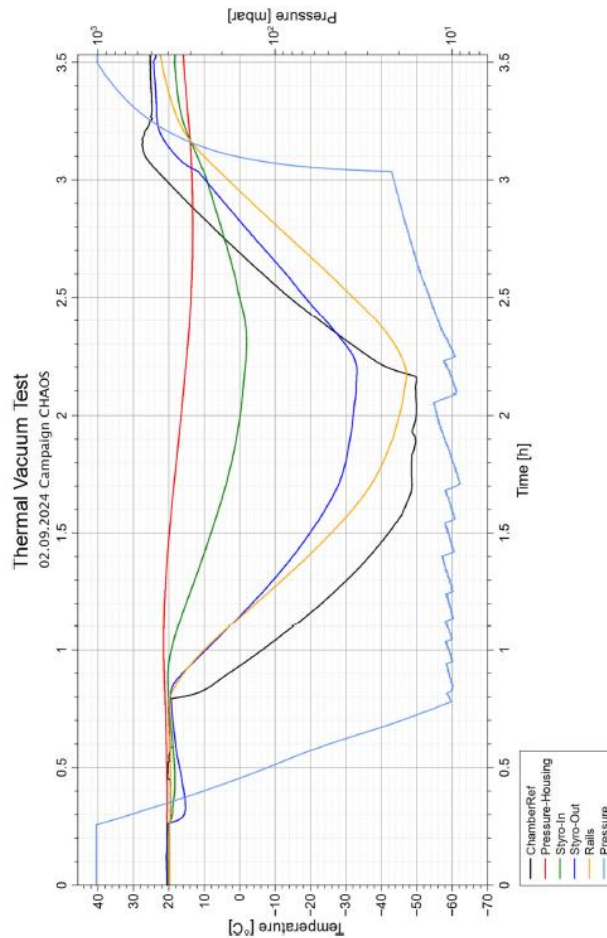
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|   |   | Page: 2 / 2                    |

**INSTRUMENTATION:**

| Type             | Name           | S/N#          | Cal. until  |
|------------------|----------------|---------------|-------------|
| Data acquisition | Yokogawa MW100 | 91SA22033     | 18-Feb-2026 |
| Thermocouple     | TC Type T      | 21/28 - 21/75 | 11-Jun-2025 |
|                  |                | 24/02 - 24/06 | 11-Jun-2025 |

**PLOT:**



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