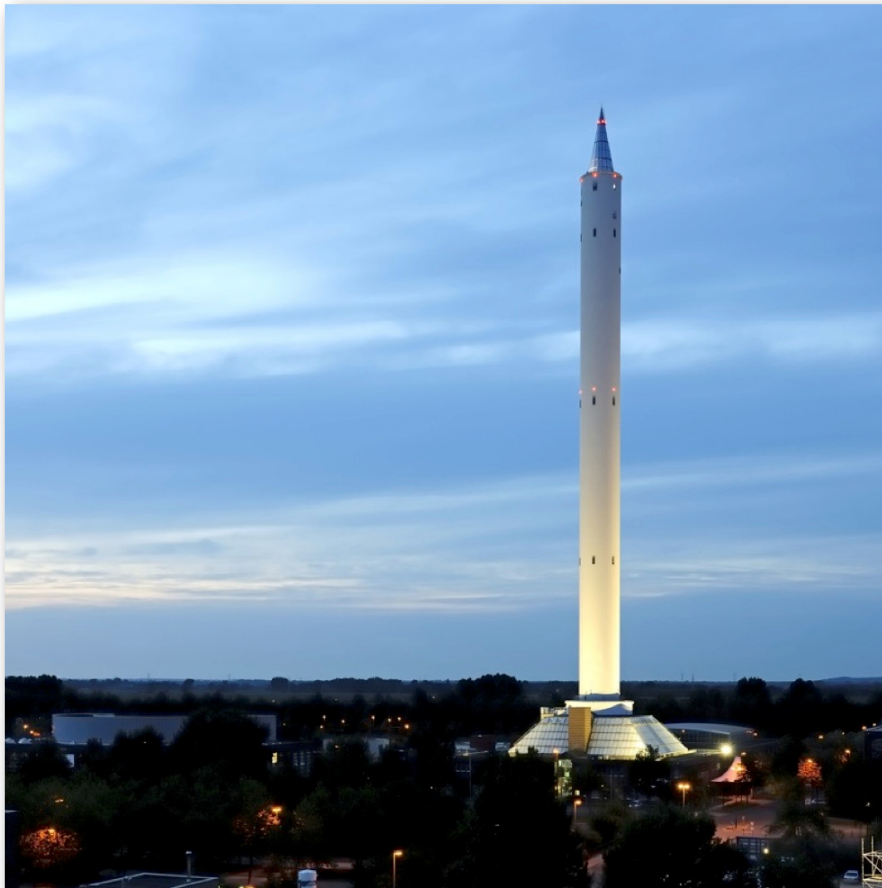


DropTES - a new Fellowship Program of UNOOSA at the Bremen Drop Tower



Claus Lämmerzahl

ZARM FAB mbH

**ZARM Drop Tower Operation
and Service Company**

**c/o University of Bremen
Am Fallturm
28359 Bremen
Germany**

www.zarm.uni-bremen.de



Bremen - Where We Come From ...



Bremen - Where We Come From ...

- **UNESCO World Heritage**
 - **The Bremen Town Hall**
 - **The Bremen Roland**



Bremen - Where We Come From ...

- **Largest Aerospace Site in Germany**
 - **Aerospace Companies:**
 - Airbus Defence and Space / „Astrium“ (Columbus Module, ATV, Ariane, ...)
 - OHB System (Galileo, MTG, ...)
 - Airbus
 - **Space Research Institutes:**
 - DLR - Institute of Space Systems (German Aerospace Center)
 - ZARM - University of Bremen (Cooperations, Education)
 - **Space Conferences:**
 - IAC 2003 -> IAC 2017 - Application
 - COSPAR 2010

Bremen Town Musicians



Outline

1. Introduction: ZARM

2. Introduction: Bremen Drop Tower

3. DropTES - Drop Tower Experiment Series



ZARM's Organization Structure

founded
in 1985

ZARM - Center of Applied Space Technology and Microgravity

c/o University of Bremen
Am Fallturm, 28359 Bremen, Germany
www.zarm.uni-bremen.de



ZARM - University of Bremen



Research Institute - Faculty 04 Production Engineering

Prof. Dr. Claus Lämmerzahl
(Executive Director)

Prof. Dr. Claus Lämmerzahl
(Director Space Science)

Prof. Dr. Claus Braxmaier
(Director Space Technology)

- to be announced -
(Director Fluid Dynamics)

ZARM FAB mbH



ZARM Drop Tower Operation and Service Company

Prof. Dr. Claus Lämmerzahl
Peter von Kampen
(Executive Board)

Christian Eigenbrod
Dr.-Ing. Thorben Könemann
Ulrich Kaczmarczik
(Scientific / Technical Management)

ZARM Technik AG



Supplier of Attitude Control Equipment for Satellites

Holger W. Oelze
(Chief Executive Officer)

Peter von Kampen
(Chief Financial Officer)

Marco R. Fuchs
(Chairman of the Supervisory Board)

› Research / Teaching

› Drop Tower

› Space Hardware



Center of Applied Space Technology and Microgravity

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ZARM - University of Bremen



**Research Institute - Faculty 04
Production Engineering**

▸ approx. 70
Scientists / Staff

▸ approx. 30
Students

from Engineering, Physics,
Mathematics, Computational Science

▸ Research / Teaching

ZARM FAB mbH



**ZARM Drop Tower Operation
and Service Company**

▸ 20 Engineers / Staff

▸ Drop Tower

ZARM Technik AG



**Supplier of Attitude Control
Equipment for Satellites**

▸ 10 Engineers / Staff

▸ Space Hardware



Center of Applied Space Technology and Microgravity

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for
Young Scientists

ZARM - University of Bremen



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ZARM Drop Tower Operation
and Service Company

▸ 20 Engineers / Staff

▸ Drop Tower

ZARM Technik AG



Supplier of Attitude Control
Equipment for Satellites

▸ 10 Engineers / Staff

▸ Space Hardware

Friends of ZARM

▸ Support



Center of Applied Space Technology and Microgravity

ZARM's Research Institute

ZARM - University of Bremen Research Institute - Faculty 04 Production Engineering

c/o University of Bremen
Am Fallturm, 28359 Bremen, Germany
www.zarm.uni-bremen.de



Space Science

Director

Prof. Dr. Claus Lämmerzahl

Experimental Gravitation &
Quantum Optics

Quantum Theory & Gravity

Gravitational Theory

Micro Satellite Systems &
Modelling Methods

Thermofluid Dynamics

Space Technology

Director

Prof. Dr. Claus Braxmaier

Metrology & AVIT

Space Propulsion &
Energy Systems

Aerospace Combustion
Engineering

Space Components /
Environmental Testing

Phase 0/A Studies

Fluid Dynamics

Acting Director

Prof. Dr.-Ing. Michael Dreyer

Multiphase Flow

Experimental Fluid Mechanics

Research Groups & Sub-Groups



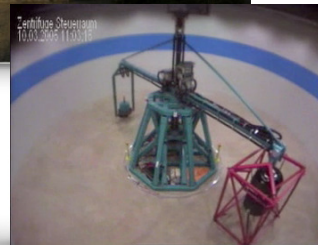
Center of Applied Space Technology and Microgravity

ZARM's Research and Test Facilities

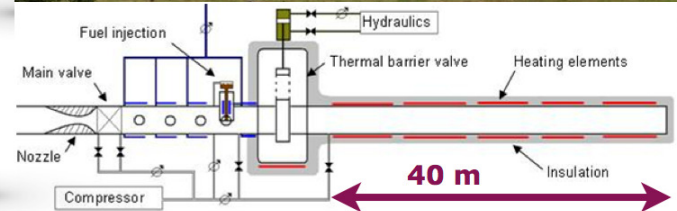
1. Drop Tower



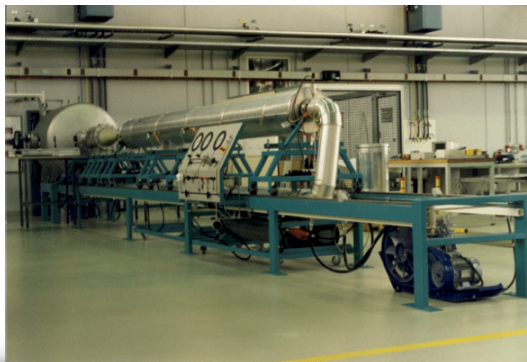
2. 30g-Centrifuge



3. Hot Wind Tunnel



4. Hypersonic Wind Tunnel



5. Circulating Water Tunnel



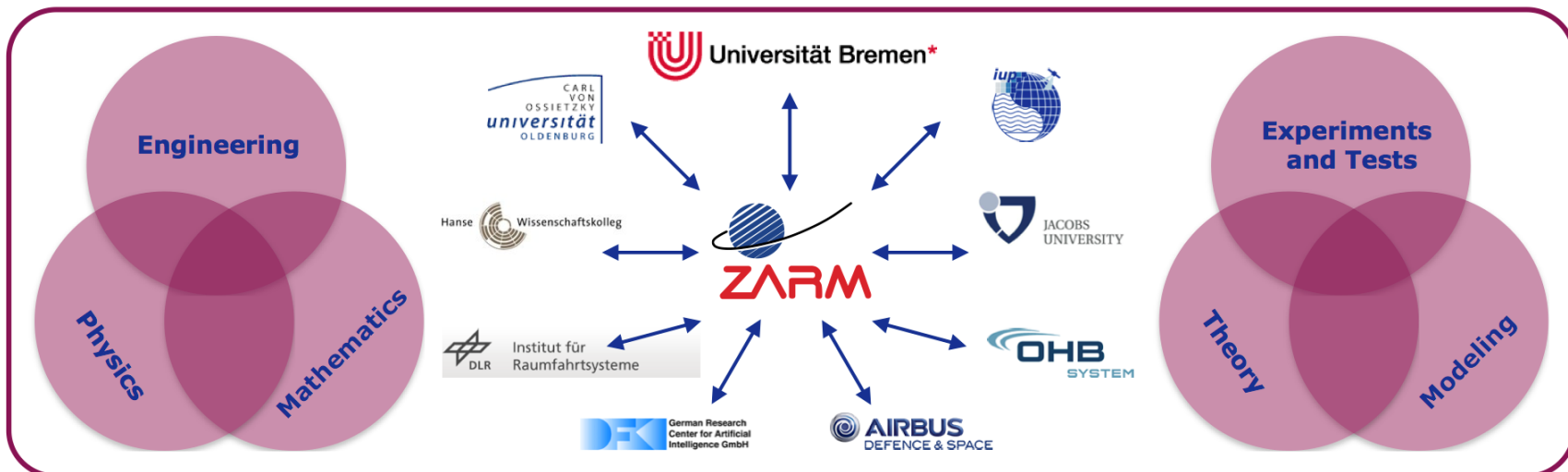
6. Vibration Test Laboratory



ZARM's Expertise and Networks

at one
location

- **Unique Expertise in Space Research and Space Technology**
 - through multi-, interdisciplinary and synergetic studies



- **Support of Students / Young Scientists in Space Experiments**
 - **Drop Your Thesis! - Student Program by ESA**
 - **REXUS / BEXUS - Student Program by DLR / SNSB**



Outline

1. Introduction: ZARM

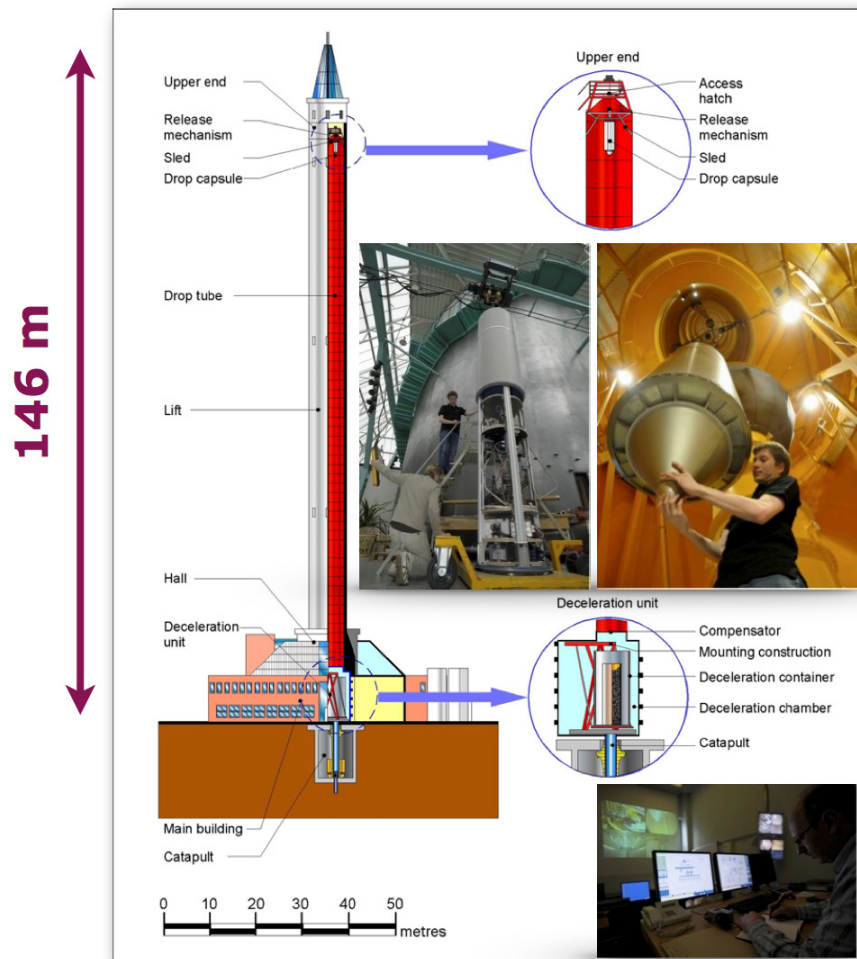
2. Introduction: Bremen Drop Tower

3. DropTES - Drop Tower Experiment Series



F A B

Introduction: The Bremen Drop Tower

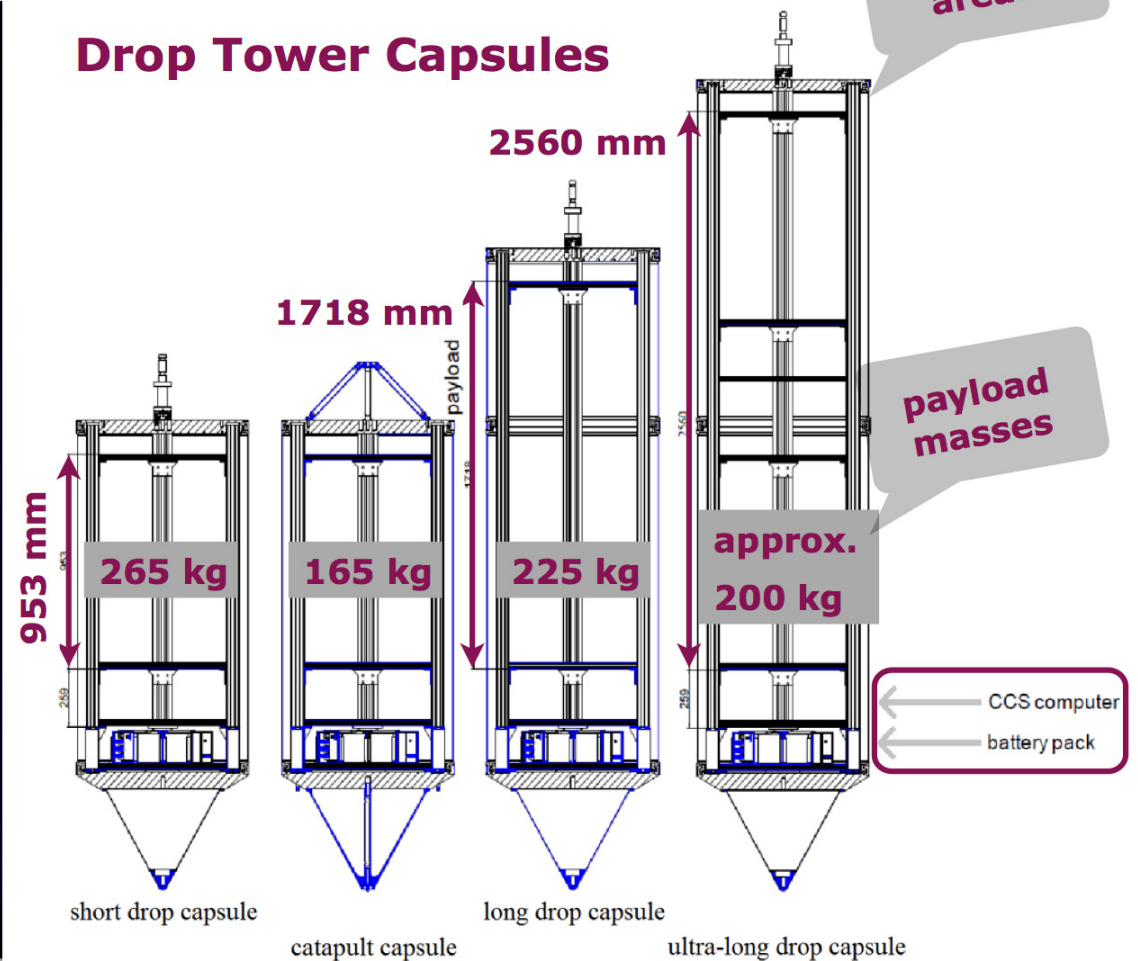


- **microgravity options:**
 - **drop mode**
 - **4.74 s weightlessness**
 - **high-quality 10^{-6} g (μ g)**
 - **deceleration up to 50 g**
 - **catapult mode**
 - **9.3 s weightlessness**
 - **high-quality 10^{-6} g (μ g)**
 - **acceleration up to 30 g**
 - **deceleration up to 50 g**
- **up to 3 times per day**
- **ground-based space laboratory**
 - **easy access**
 - **quick access**
 - **economic access**

Introduction: The Bremen Drop Tower



Drop Tower Capsules



Introduction: The Bremen Drop Tower

Center of Applied Space Technology and Microgravity

Bremen - Germany

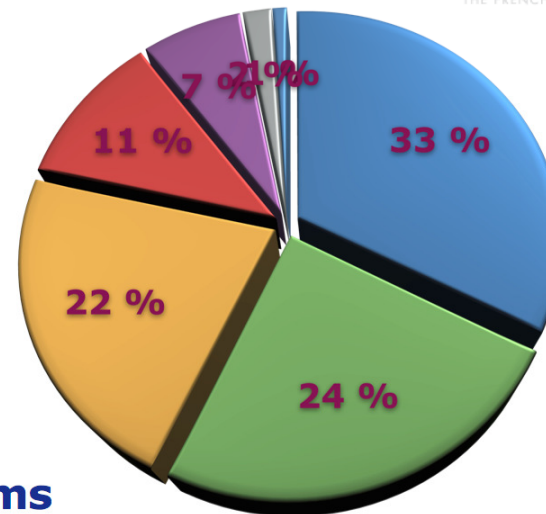


we create space for experiments

Introduction: The Bremen Drop Tower

- since the start of operation of the Drop Tower Bremen:
 - › over **6750 drops / catapult launches** have been conducted
 - › more than **160 different experiment types** have been integrated
 - › within **international collaborations from 42 countries**

- research fields of conducted drop tower experiments



- › supported by DLR and/or ESA
- › through simple user application forms
- › **scientific utilization is free of charge !** - after a positive proposal evaluation -
- › including technical services by **ZARM FAB mbH** (consulting, integration, ...)

Outline

1. Introduction: ZARM

2. Introduction: Bremen Drop Tower

3. DropTES - Drop Tower Experiment Series



DropTES - Drop Tower Experiment Series

- **Human Space Technology Initiative (HSTI) Science Activity**
 - › provides one team of **Bachelor, Master and/or PhD students** (who must be endorsed by an academic supervisor)
 - › to conduct one drop tower experiment series **in November 2014**
 - › in total **four drops or catapult launches** at the Bremen Drop Tower
- **The DropTES Fellowship Programme**
 - › is open to research teams **from non-space-faring countries**
 - › and includes **financial support**:
 - the travel costs are covered by **UNOOSA**
 - the four drops or catapult launches are covered by **DLR**
 - for the stay in Bremen **ZARM** provides its on-site apartment
- **The selected team of Bachelor, Master and/or PhD Students**
 - › will develop their drop tower experiment in strong cooperation with the **ZARM Drop Tower Operation and Service Company**



UNITED NATIONS
Office for Outer Space Affairs





DropTES - Drop Tower Experiment Series

DropTES
Schedule

- **Timeline of the Application and Selection Process:**

- **deadline for application submission:** February 28, 2014
- **selection of applicants:** April 1, 2014

- **Timeline of the Experiment Process:**

- **preparation of drop tower experiment:** April - October, 2014
- **transfer of the experiment to Bremen:** October - November, 2014
- **Drop Tower Experiment Series in Bremen:** November 24-28, 2014
(experiment integration at the drop tower: 1-2 weeks in advance)
- **experiment report submission:** March 31, 2015

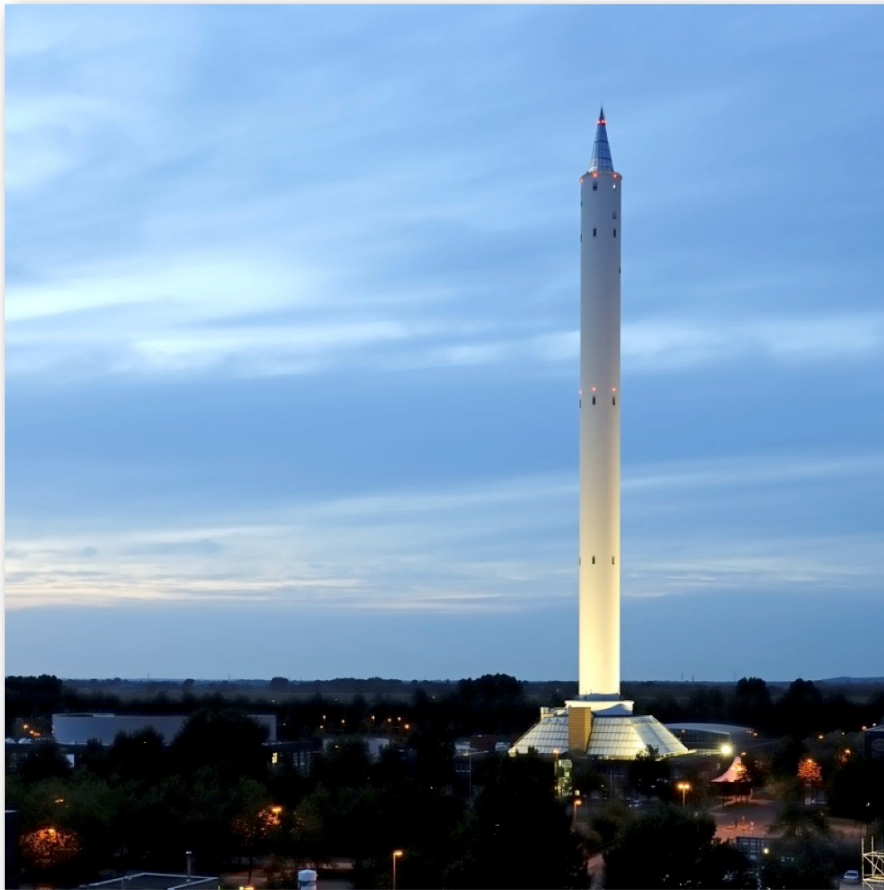
- **Latest Information on the HSTI DropTES Fellowship Programme:**

- <http://www.unoosa.org/oosa/en/SAP/hsti/index.html>

- **Further Information regarding DropTES Programme and Applications:**

- hsti-droptes@unoosa.org

Thank You very much for Your Attention



Claus Lämmerzahl

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