

DROPTES - A UN-HSTI FELLOWSHIP PROGRAM

REPORT ON FIRST CYCLE

February 10, 2015

STSC 2015 - UNITED NATIONS OFFICE, VIENNA, AUSTRIA

Thorben Könemann

ZARM Drop Tower Operation and Service Company



DropTES - A UN-HSTI Fellowship Program

▶ „Drop Tower Experiment Series“

- ▶ Human Space Technology Initiative (HSTI) Science Activity
 - ▶ for student teams from non-space-faring countries
 - ▶ offers selected applicants the unique opportunity to conduct short-term experiments under conditions of weightlessness
 - ▶ at the Bremen Drop Tower in Bremen, Germany (annually)
- ▶ first initiated by UNOOSA, DLR and ZARM in 2014

▶ Executing Agency:

United Nations Office for Outer Space Affairs (UNOOSA)



UNITED NATIONS
Office for Outer Space Affairs

▶ Supporting Agency: German Aerospace Center (DLR)



▶ Hosting Institution:

Center of Applied Space Technology and Microgravity (ZARM)

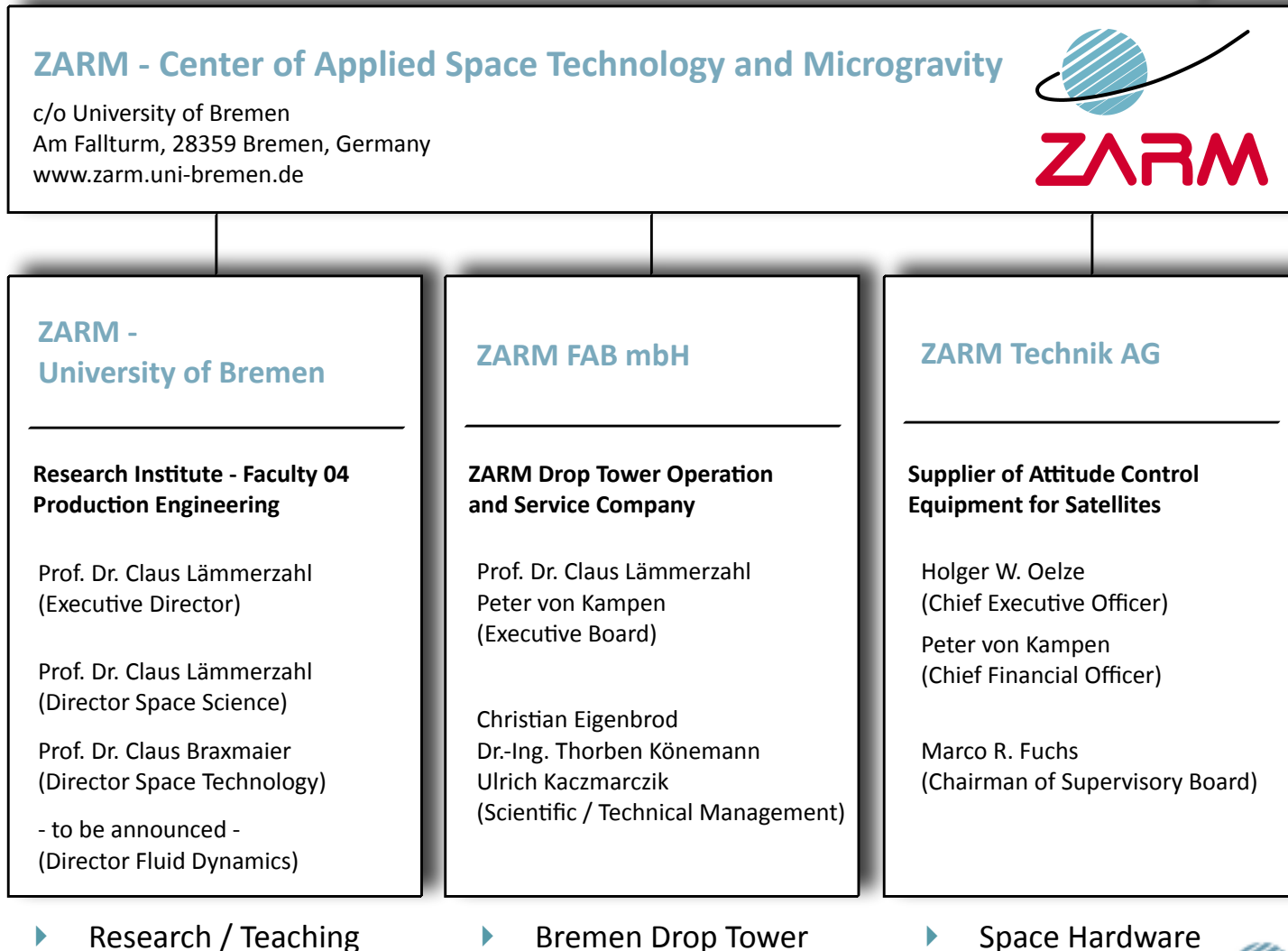


Content

- ▶ ZARM
 - ▶ Overview
- ▶ The Bremen Drop Tower
 - ▶ Introduction
 - ▶ Operation
 - ▶ Facts and Figures
- ▶ DropTES - Drop Tower Experiment Series
 - ▶ Program Information
 - ▶ Report on first Cycle

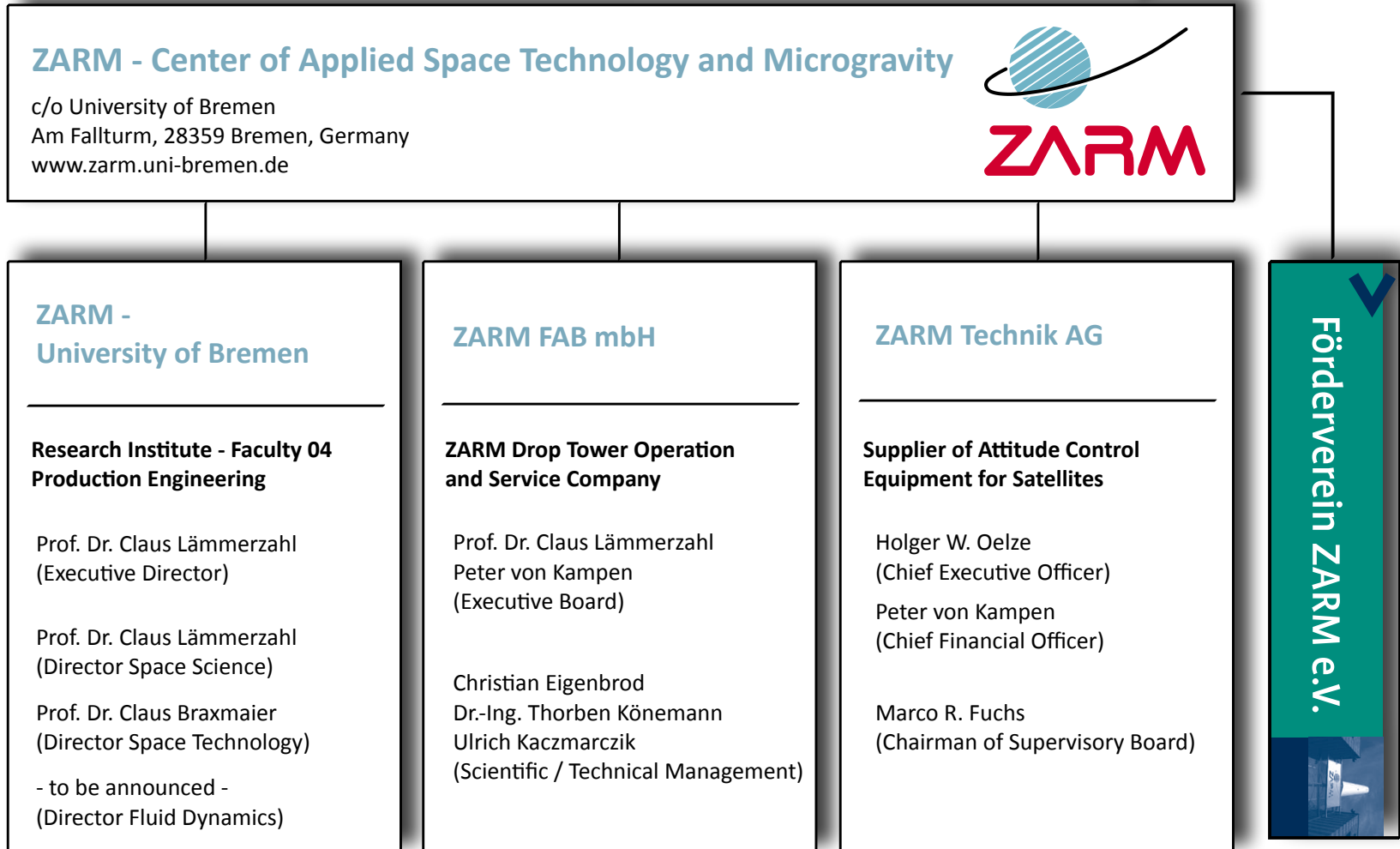
ZARM's Organization Structure

founded
in 1985



ZARM's Organization Structure

Support of
Young Scientists



▶ Research / Teaching

▶ Bremen Drop Tower

▶ Space Hardware

ZARM's Student Programs

Support of
Young Scientists

ZARM - Center of Applied Space Technology and Microgravity

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



DropTES - UNOOSA -

Drop Tower Experiment Series

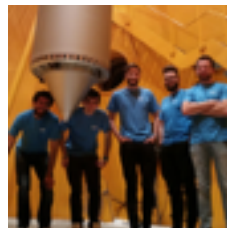


UNITED NATIONS
Office for Outer Space Affairs

▶ Bremen Drop Tower

Drop Your Thesis! - ESA Education Office -

Drop Tower Experiment Series



▶ Bremen Drop Tower

REXUS / BEXUS - DLR / SNSB -

Sounding Rocket and Balloon Experiment Series



RYMDSTYRELSEN
Swedish National Space Board

▶ Esrange Space Center
Kiruna, Sweden

ZARM's Research and Test Facilities



▶ The Bremen Drop Tower
- Microgravity Experiments -



▶ 30g - Centrifuge
- Hypergravity Exp. / Aerospace Tests -



▶ Hot Wind Tunnel
- Combustion Experiments -



▶ Centrifuge Operation



▶ Refrigerator Test

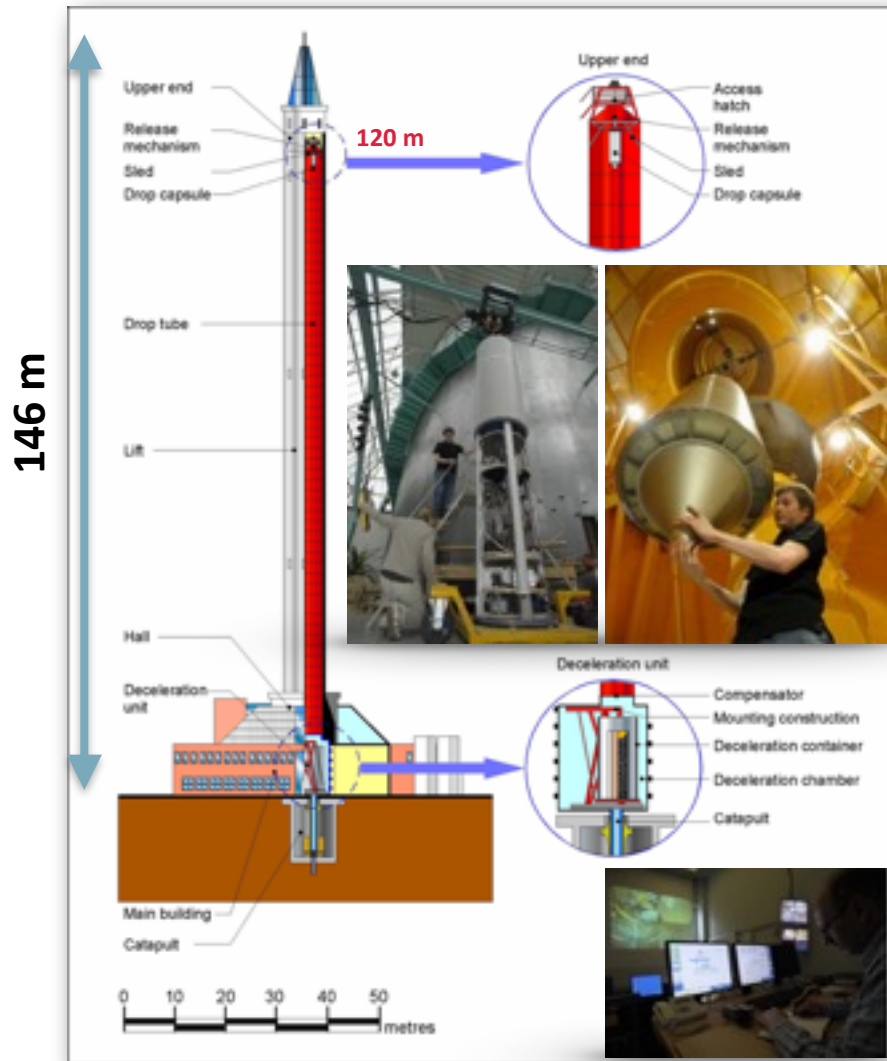


▶ Vibration Test Laboratory
- Aerospace Tests -

Content

- ▶ ZARM
 - ▶ Overview
- ▶ The Bremen Drop Tower
 - ▶ Introduction
 - ▶ Operation
 - ▶ Facts and Figures
- ▶ DropTES - Drop Tower Experiment Series
 - ▶ Program Information
 - ▶ Report on first Cycle

The Bremen Drop Tower - Introduction

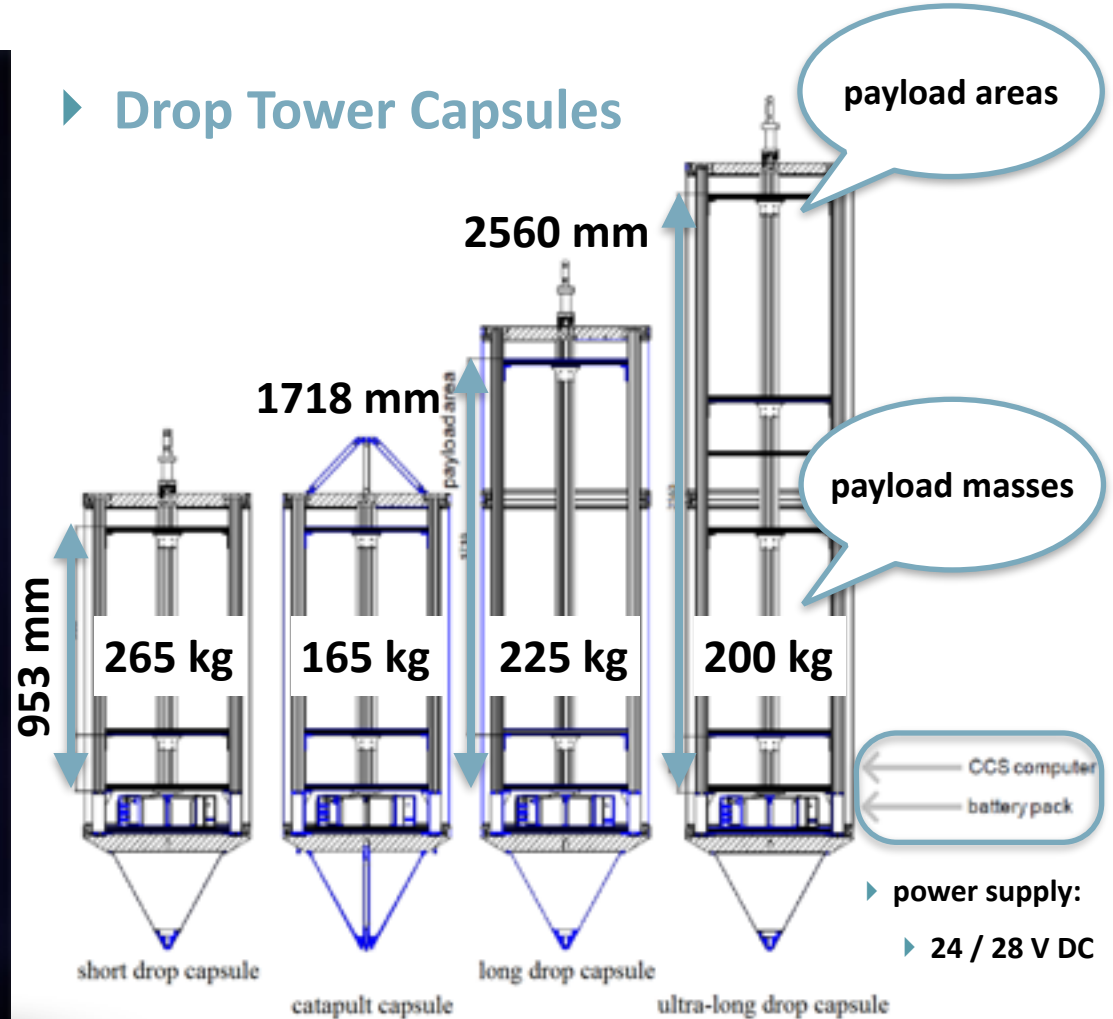


- ▶ drop mode:
 - ▶ 4.74 s in weightlessness
 - ▶ highest quality - 10^{-6} g (μ g)
 - ▶ decelerations of up to 50 g
- ▶ catapult mode:
 - ▶ worldwide unique facility
 - ▶ 9.3 s in weightlessness
 - ▶ highest quality - 10^{-6} g (μ g)
 - ▶ accelerations of up to 30 g
 - ▶ decelerations of up to 50 g
- ▶ daily operations (up to 3 times)
- ▶ on-site technical support

The Bremen Drop Tower - Introduction



▶ Drop Tower Capsules



The Bremen Drop Tower - Operation



ZARM

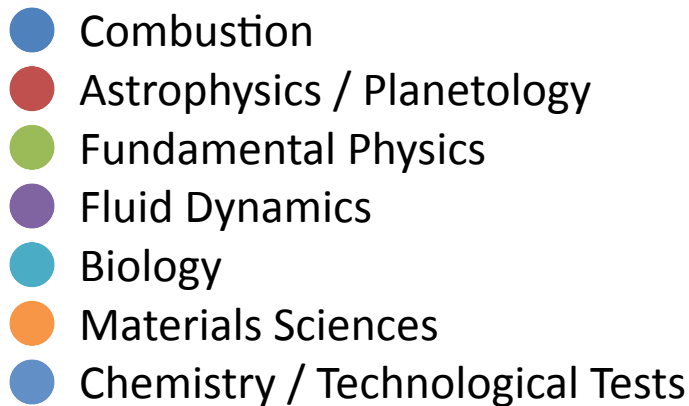
Droptower Bremen



ZARM

The Bremen Drop Tower - Facts and Figures

- ▶ Since the Start of Operation in 1990
 - ▶ over 7000 drops / catapult launches have been conducted
 - ▶ more than 160 different experiment types have been integrated
 - ▶ within international collaborations from 42 countries
- ▶ Research Fields of Drop Tower Experiments



Content

- ▶ ZARM
 - ▶ Overview
- ▶ The Bremen Drop Tower
 - ▶ Introduction
 - ▶ Operation
 - ▶ Facts and Figures
- ▶ DropTES - Drop Tower Experiment Series
 - ▶ Program Information
 - ▶ Report on first Cycle

DropTES - A UN-HSTI Fellowship Program

- ▶ „Drop Tower Experiment Series“ - Program Information
 - ▶ designed for heads of research groups or university professors with a team of Bachelor, Master and/or PhD students
 - ▶ allowing to realize a **real space / microgravity research project**
 - ▶ this hands-on drop tower project shall be an integral part of the **student's syllabus, e.g. as Bachelor, Master and/or PhD theses**
 - ▶ following space project guidelines (proposal, reports, reviews)
 - ▶ each **drop tower experiment series** consists of **four drops or catapult launches** which have to be conducted within one week
 - ▶ travel, accommodation and drop tower utilization **sponsored**
 - ▶ program language: English
 - ▶ program duration: May - March / experiment series: November



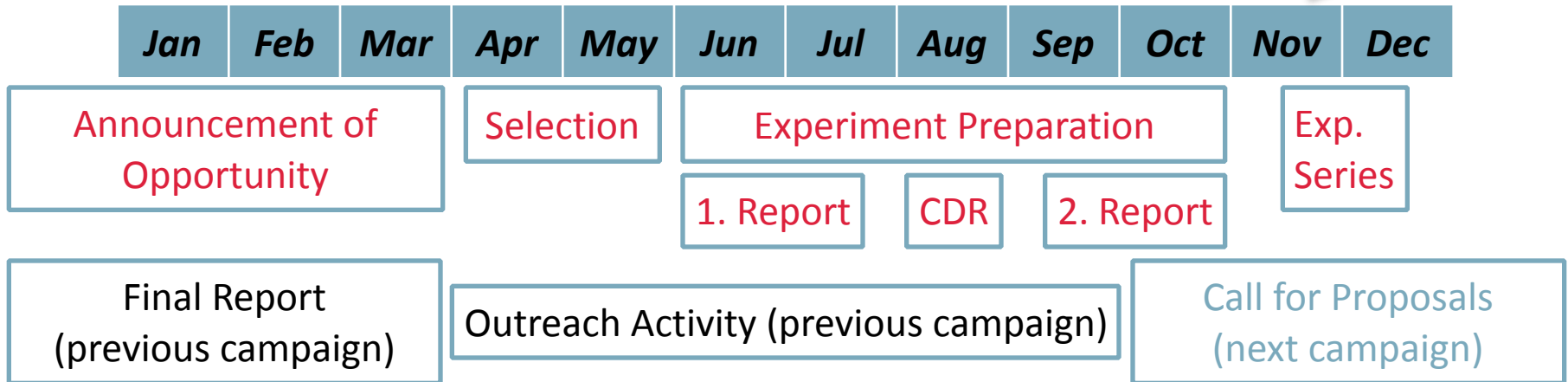
UNITED NATIONS
Office for Outer Space Affairs



DropTES - A UN-HSTI Fellowship Program

▶ „Drop Tower Experiment Series“ - Schedule

integration
+ exp. week



▶ Selection Process:

ONE RESEARCH TEAM PER YEAR

- ▶ proposal evaluation by selection board (UNOOSA, DLR, ZARM)

▶ Eligibility Criteria:

NON-SPACE-FARING COUNTRY

- ▶ student team -> up to 4 Bachelor, Master and/or PhD students

WHO MUST BE ENDORSED BY AN ACADEMIC SUPERVISOR



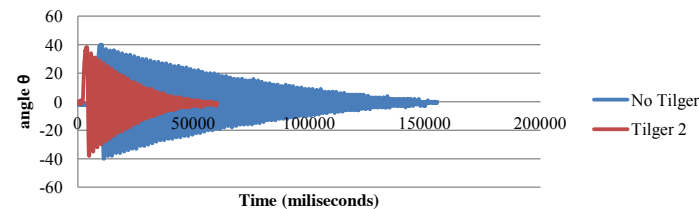
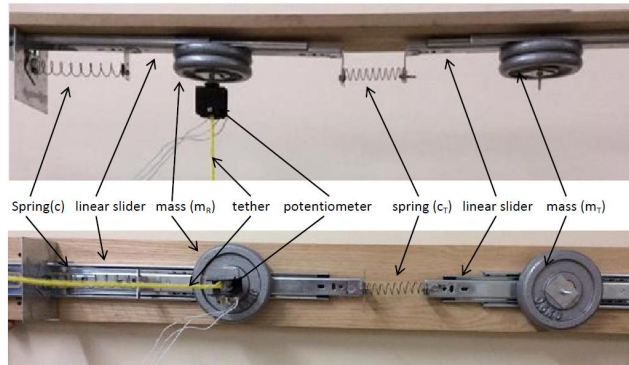
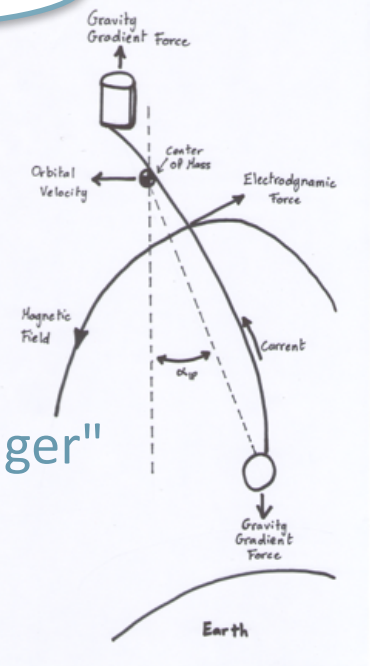
ZARM

Content

- ▶ ZARM
 - ▶ Overview
- ▶ The Bremen Drop Tower
 - ▶ Introduction
 - ▶ Operation
 - ▶ Facts and Figures
- ▶ **DropTES - Drop Tower Experiment Series**
 - ▶ Program Information
 - ▶ Report on first Cycle

DropTES - Report on first Cycle

- ▶ „Drop Tower Experiment Series“ - First Cycle
 - ▶ 5 proposal received - student team from the German Jordanian University (GJU) selected
 - ▶ „Stabilizing the Electrodynamic Tether by using Tilger“
- ▶ Experiment Preparation at GJU in Jordan
 - ▶ initial and improved rail system setup (after CDR)

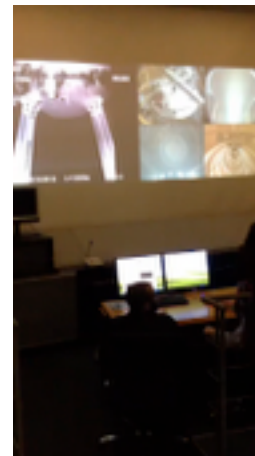
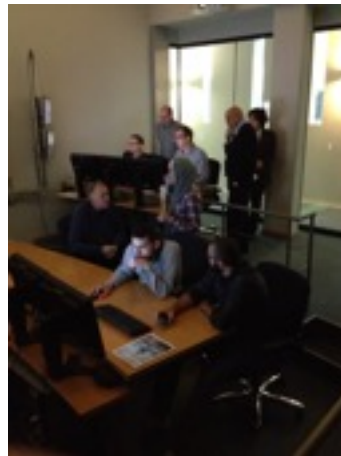


DropTES - Report on first Cycle

- ▶ „Drop Tower Experiment Series“ - Integration Week

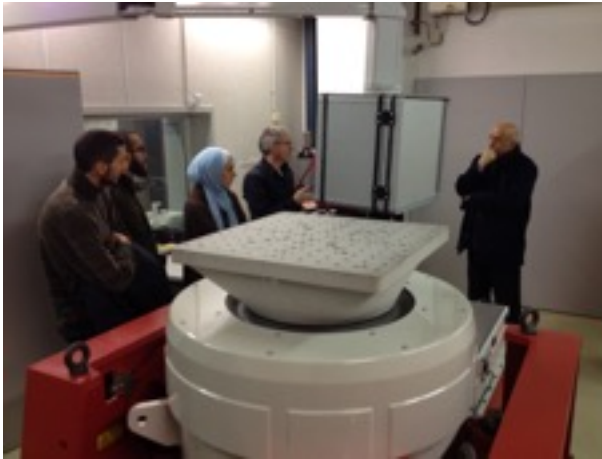


- ▶ „Drop Tower Experiment Series“ - Experiment Week

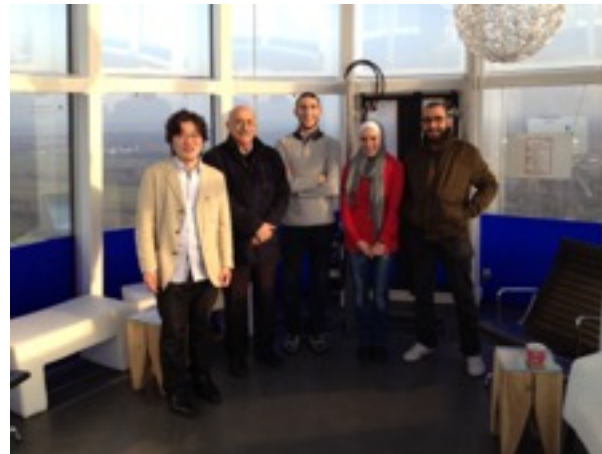
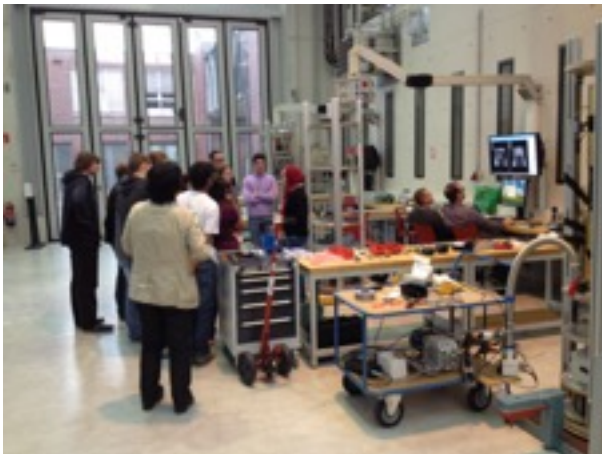


DropTES - Report on first Cycle

► „Drop Tower Experiment Series“ - Facility Tours



► „Drop Tower Experiment Series“ - Experiences



participate in
DropTES

TAKE THE OPPORTUNITY
visit UNOOSA / HSTI website
for more information

UPCOMING DEADLINE
AO (2nd cycle) March 31, 2015

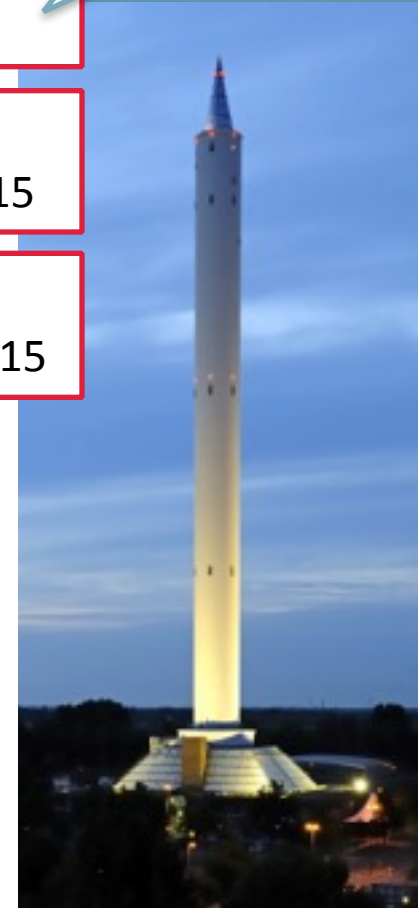
NEXT ANNOUNCEMENT
AO (3rd cycle) October 01, 2015

**THANK YOU VERY MUCH
FOR YOUR ATTENTION**

ACKNOWLEDGEMENT



Thorben Könemann
ZARM Drop Tower Operation and Service Company



***EXZELLENT.**
Gewinnerin in der
Exzellenzinitiative

CENTER OF
APPLIED SPACE TECHNOLOGY
AND MICROGRAVITY

