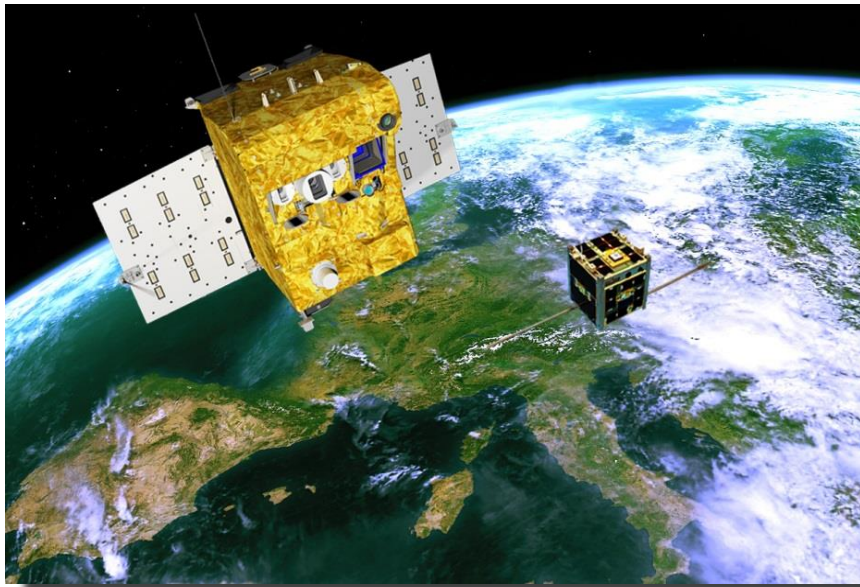


12th IAA SYMPOSIUM

Final Announcement

ON SMALL SATELLITES

FOR EARTH OBSERVATION



Composition picture: DLR

May 06 - 10, 2019

**BBAW,
Gendarmenmarkt**

BERLIN, GERMANY



*International
Academy of
Astronautics*

Supported and hosted by



**Deutsches Zentrum
für Luft- und Raumfahrt e.V.**



We wish to thank the following for their contribution to the success of this conference (in alphabetical order):



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Chair of the Executive Board of DLR

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Chairman

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Klaus Brieff

Head Chair of Space Technology

Technical University of Berlin (Germany)

Eberhard Gill

Head Department of Space Engineering (SpE)

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FROM THE CHAIRMEN

It is a pleasure for the three General Chairmen to invite the international community to the 12th IAA Symposium on Small Satellites for Earth Observation. The symposium will be hosted by the German Aerospace Center (DLR) and the Technical University of Berlin and be held in Berlin from May 06th-10th, 2019. The successes of preceding IAA Symposia were shown by the high interest in the use of small satellites for dedicated missions applied to Earth observation, from scientific Earth observation to technology demonstration missions. In all of these IAA symposia, authors from about 35 countries, representing space agencies, industries, knowledge institutes, and academia confirmed in their oral and poster contributions that these types of missions can be conducted efficiently, provide increased opportunity for access to space and even realize new functionalities and services. The spacecraft bus and its payloads can be based either on optimized off-the-shelf systems, with little or no requirements for new technology, or on new high-technology systems. Thus a new class of advanced small satellites, including autonomously-operating „intelligent“ satellites can be created, opening new fields of application for science and the public. Distributed Space Systems, such as constellations and formations, based on small satellites lead to a new economy in space.

This symposium again offers many opportunities for exchanging information, exploring new concepts, encouraging international cooperation in mission planning, and developing new collaborative relationships among individuals and institutions. We included again the Student Prize Paper Competition. The student papers have been evaluated by distinguished judges selected from academia, industry and government, coming from different continents. The prizes are funded by different organizations (industry and institutions). The IAA is pleased to serve as the principal sponsor of this symposium because its objectives complement and reinforce the purpose of the Academy.

It is a pleasure for the German Aerospace Center (DLR) in Berlin-Adlershof to be the host of this symposium. DLR's site Berlin-Adlershof has been successfully involved in space research for many years. Together with other relevant institutes of the DLR, it is now involved in many international and national projects for Earth observations, planetary sciences, technology development and in-orbit verification. The Technische Universität Berlin is pleased to be the co-host of the 12th symposium. The TU Berlin has already brought into orbit 16 own satellites for Earth observation and satellite communication. They are designed, built and operated with students.

Last but not least, Berlin provides a good environment because this city continuously pursues new architectural approaches in urban development after the reunification of Germany. We believe that Berlin is a bridge between the West and East as well as the North and South. As in the previous symposia, Berlin may serve symbolically as a meeting place for information exchange and collaborative development between the two hemispheres, as well as a bridge between the classical space missions and innovative approaches using smaller and smaller satellites for dedicated objectives.

We are looking forward to meeting you in Berlin in May 2019.



Rainer Sandau



Klaus Briess



Eberhard Gill

Objective of the Symposium

The Symposium will provide a forum for scientists, engineers and managers to exchange information and present new ideas, covering small satellite mission objectives as well as technology and management aspects for dedicated Earth observation satellites. Distinguished speakers, in-depth paper and poster sessions, and a Symposium summary are planned. Sessions will be held from Monday, May 6 through Thursday, May 9. On Friday, May 10, a visit is offered to the German Aerospace Center (DLR) in Berlin-Adlershof.

Critical Dates

May 30, 2018	Call for Papers
October 31, 2018	Abstracts Due
November 30, 2018	Notification to authors
December 15, 2018	Final Announcement
January 31, 2019	Extended abstract due (4 pages)
May 06, 2019	Final paper due (max. 8 pages)
May 06 - 10, 2019	12 th Symposium
July 2019	Proceedings

Awards

The authors / presenters of the best student papers will be awarded prizes funded by various organizations (industry and institutions) at the IAA Dinner on Tuesday night (May 7, 2019).

The presenters of the two best paper contributions and the two best interactive poster contributions will receive awards at the end of the Symposium.

The Symposium Venue:

Berlin-Brandenburgische Akademie der Wissenschaften (BBAW)

The Berlin Brandenburg Academy of Sciences and Humanities, founded by Gottfried Wilhelm von Leibniz in 1700, stands for 300 years of support for research activities. It attained worldwide reputation and recognition as the Prussian Academy of Sciences. Its members have included the Brothers Grimm, Alexander von Humboldt, Max Planck, Lise Meitner and Albert Einstein. Throughout its history the Society could rank 78 Nobel Laureates among its members. There are bilateral agreements on scientific co-operation with about 20 Academies from around the world.



For further information please visit www.bbaw.de

SYMPOSIUM SCHEDULE

12th IAA Symposium on Small Satellites for Earth Observation

Sunday, May 05, 2019

16:00-20:00 Registration, BBAW¹
19:00-20:00 Get-Together

Monday, May 06, 2019

08:00-09:00 Registration, BBAW

09:00-09:15 **Welcome:**
Representative Senate of Berlin
J.-M. Contant,
Secretary General IAA
Representative of DLR

09:15-10:00 **Keynote Address:**
F. Ongaro
ESA TEC Director

10:00-10:40 BREAK,

10:40-12:20 **Session 01:**
PROGRAMMATICS
Chairs:
F. Ongaro, ESA, NL
P. Patterson, USU/SDL, USA

12:20-13:30 LUNCH

13:30-15:00 **Session 02:**
MISSIONS I
Chairs:
A. da Silva Curiel, SSTL, UK
GP Sandhoo, NLR, USA

15:00-15:20 BREAK

15:20-16:40 **Session 03:**
SENSOR SYSTEMS
Chairs:
S. Neeck, NASA/HQ, USA
C. Underwood, SSC, UK

16:40-17:40 **Round Table:**
**Who rules space-based EO:
Business or Governments ?**
Chairs:
N. Frischauf, SpaceTec Partners, DE

Tuesday, May 07, 2019

09:00-10:30 **Session 04:**
CONSTELLATIONS/ FORMATIONS
Chairs:
O. Koudelka, TU Graz, AUT
M. Ovchinnikov, KIAM, RUS

10:30-10:50 BREAK

10:50-12:10 **Session 05:**
INTEGRATED APPLICATIONS
Chairs:
A. Court, TNO, NL
S. Mostert, SCS, ZAF

12:10-13:30 LUNCH

13:30-15:00 **Session 06:**
STUDENT CONFERENCE
Chairs:
S. Kennedy, OAI, USA
L. Paxton, JHU/APL, USA

15:00-15:20 BREAK

15:20-16:40 **Session 07:**
AOCS
Chairs:
W.H. Steyn, SUN, ZAF
T. Terzibaschian, DLR, DE

16:40-17:40 **POSTER SESSION I**

¹ Berlin-Brandenburgische Akademie der Wissenschaften

Wednesday, May 08, 2019

- 09:00-10:30 **Session 08:**
LESSONS LEARNED
Chairs:
J. Esper, NASA, USA
A. Zuccaro Marchi, ESA, NL
- 10:30-10:50 BREAK
- 10:50-12:10 **Session 09:**
ON-BOARD PROCESSING
Chairs:
M. Barschke, TU Berlin, DE
A. Rogers, JHU/APL, USA
- 12:10-13:30 LUNCH
- 13:30-15:00 **Session 10:**
NEW PLATFORMS
Chairs:
L. Alkalai, NASA/JPL, USA
H. Kuiper, TU Delft, NL
- 15:00-15:20 BREAK
- 15:20-16:40 **Session 11:**
INFRARED MISSIONS
Chairs:
L. Gratton, Colomb Inst., ARG
W. Halle, DLR, DE
- 16:40-17:40 **POSTER SESSION II**

Thursday, May 09, 2019

- 09:00-10:30 **Session 12:**
COMMUNICATIONS
Chairs:
Y.-A. Liou, CSRSR, TWN
Z. Yoon, TU Berlin, DE
- 10:30-10:50 BREAK
- 10:50-12:10 **Session 13:**
GROUND SEGMENT
Chairs:
J.-N. Bricout, CNES, FR
K. Schilling, JMU Würzburg, DE
- 12:10-13:30 LUNCH
- 13:30-15:00 **Session 14:**
SPECIAL ASPECTS
Chairs:
R. Laufer, Baylor, USA
M. Saandar, MSPRS, MON
- 15:00-15:20 BREAK
- 15:20-16:40 **Session 15:**
DISTRIBUTED SYSTEMS
Chairs:
I. Belokonov, SSAU, RUS
S. Roemer, Antwerp Space, BEL
- 16:40-17:40 **Symposium Summary**
Chairs:
K. Brieß, TU Berlin, DE
R. Sandau, IAA, FR
E. Gill, TU Delft, NL
Chief Rapporteur:
A. Rogers, JHU/APL, USA

AWARDS

Friday, May 10, 2019

- 09:00-13:00 **Excursion to:**
DLR Adlershof

GENERAL INFORMATION

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www.berlin-space-tech.com

Symposium Venue

The symposium will take place in the Berlin-Brandenburgische Akademie der Wissenschaften (BBAW), Jaegerstraße 22/23, 10117 Berlin (mail address). For the symposium please use the entrance from Markgrafenstraße 38 (Gendarmenmarkt). Underground station: Stadtmitte (U2). Phone: +49-30 20370-0, Fax: +49-30 20370-600. More information: www.bbaw.de

Language

The official language of the symposium is English.

Audio Visual Equipment

The symposium room will be equipped with a video projector with PC interface, video recorder and overhead projectors. WLAN in the convention rooms and exhibition rooms will be available. If there is a need for any other equipment please contact the Symposium Secretariat by contour.berlin@t-online.de

Official Agent

ConTour GmbH is the official agent to the symposium. It is in charge of the registration, accommodation, social programs and tours for the participants as well as the exhibition.

Passport and Visa

An identity card is sufficient for citizens of EU member countries. A valid passport is required for citizens of other countries. Visas are required for residents of some countries; consult the German embassy or consulate in your country for details, please.

Official Letter of Invitation

Individuals requiring an official letter of invitation in order to obtain a visa and permission to attend should contact the Symposium Coordinator Dr. Matthias Hetscher by iaa.symp@iaamail.org or matthias.hetscher@dlr.de. This letter is not an official invitation covering fees or other expenses.

Insurance

We recommend that participants carry the proper health and travel insurance as the Program Committee will not be held responsible for any illness or accident participants may incur at any time during the symposium.

Climate

The weather in Berlin in May can be unpredictable. The mean temperature range is from +9 to +19 °C. It is recommendable to bring warm clothing and be prepared for occasional showers.

Tips

There is no obligation to give tips in Germany.

Electricity 220V/50 Hz.

Arrival in Berlin

Most airlines offer direct flights to Berlin-Tegel Airport or to Berlin-Schoenefeld Airport. A taxi from one of the airports to the city center (main hotel area) costs around € 25 to € 30. Public transportation is also available at all airports. A single ticket (zone AB = the area within the city borders, price € 2.80) or a stamped section of a multiple ticket is valid for 2 hours after validation (not to be used for return or round journeys) on the entire transportation network (S-Bahn, U-Bahn, tram, bus lines). More information: [BVG](#)

Sightseeing and Tours

During the symposium local sightseeing tours and tours to Potsdam with an English-speaking guide will be arranged on demand by ConTour GmbH for accompanying persons. If you wish to order tickets for other events, concerts or theatres, please contact the concierge of the Hilton Hotel close to the BBAW or ask the hostesses on site at the Symposium Registration Desk.

City Circle Tour (by bus) – daily

Every 15 minutes - starting from 10:45 up to 15:45

A sightseeing tour bus will pick you up at Gendarmenmarkt close to the Berlin Brandenburgische Akademie der Wissenschaften. There are 18 bus stops at the most beautiful places in the town, where you can leave the bus and discover the town by your own as long as you want. The next bus will take you off and bring you to the next stop and at last home. Information in many languages is available at the sightseeing busses by headsets.

Meeting place: Station Gendarmenmarkt (for the clearly defined place please ask the hostesses at the Symposium Registration Desk or the Concierge Hilton Hotel)
Departure: 10:45 – 15:45
Fee: € 20.00 / person (tickets at the Concierge Hilton Hotel)

Tour to Potsdam (by bus) – daily except Monday

Duration: approx. 4 hours, German- and English-speaking guided

The rococo Palace of Sanssouci became the favourite refuge of Prussia's greatest King, Friedrich II. Here, the Philosopher of Sanssouci entertained some of the most educated men of his time, among them the French poet Voltaire who was a frequent guest over many years. If you want, our excursion takes you on a tour of the famous Sanssouci Palaces and the magnificent gardens.

Meeting place: Berlin Hilton
Departure: 09:15 / Fee: € 39.00 / person

REGISTRATION

Registration Fee

	By January 31, 2019	After January 31, 2019
Full Participant	€ 600.00	€ 700.00
Student (identification is required)	€ 190.00	€ 190.00
Accompanying Person *)	free	free

The registration fee includes: admission to the Sessions and to the Exhibition, Get together, Reception, Excursion, Lunches and Coffee Breaks, Conference App, Online Proceedings (published after the symposium).

*) It is possible to register one accompanying person per participant. Accompanying persons (for instance wives, relatives, friends) are not entitled to attend the sessions and they have no access to the exhibition, but are invited to the Get together and the Reception. A tour program for accompanying persons will be organized (please have a look at "Sightseeing and Tours"). Lunch tickets for accompanying persons can be bought at the registration desk (€ 15.00/day).

Pre-Registration

Please complete the Registration Form and return it - if possible - with the registration fee to ConTour before April 15, 2019. We recommend using the [online registration form](#). After that ConTour will send you a registration confirmation/invoice by e-mail. A receipt as confirmation upon receiving your registration fee you will find in your personal documents on site in Berlin. For students: Send a copy of your valid student identification by e-mail or fax to ConTour together with your Registration Form, please.

On-site Registration

The Registration Desk will be set up in the Symposium Room Foyer of the "Berlin-Brandenburgische Akademie der Wissenschaften (BBAW)", entrance Markgrafstraße 38, 10117 Berlin. More information [BBAW](#).

The working time of the Registration Desk is:

May 5, Sunday	16:00 – 20:00
May 6, Monday - May 9, Thursday	08:00 – 18:00

Participants are required to check in at the hotels first and then pick up the conference package (Documents Bag, Final Program, name badge, social events invitations) at the Registration Desk. Your ordered tour tickets and tickets for the concert are also provided there.

One-day tickets are available for € 200.00 (covering admission to the sessions of the day including coffee breaks and lunch of the same day, proceedings published after the symposium). If desired a Reception ticket can be bought (á € 35.00).

Name Badges

Name badges must be worn at all times in order to be admitted to the sessions, the exhibition and the social events.

SOCIAL EVENTS

Date/Time	Event	Venue
May 05, Sunday 19:00 – 20:00	Get-Together (included in the registration fee)	Berlin-Brandenburgische Akademie der Wissenschaften (BBAW) www.bbaw.de
May 06, Monday 18:30 – 22:30	Reception (included in the registration fee)	Ship Tour through Berlin City including dinner buffett start: Maerkisches Ufer www.sternundkreis.de
May 07, Tuesday 19:00 – 22:00	IAA-Dinner € 120.00 / person	The Regent Hotel Berlin Charlottenstraße 49 10117 Berlin www.regenthotels.com/berlin
May 08, Wednesday	free evening	
May 09 Thursday 20:00 – 22:00	Concert: Wolfgang Amadeus Mozart Anton Bruckner	Philharmonie Berlin Herbert-von-Karajan Str. 1 10785 Berlin www.berliner-philharmoniker.de
May 10, Friday 09:00 – 13:00	Excursion	DLR - German Aerospace Center Adlershof www.dlr.de

RECEPTION

Ship Tour through Berlin City

Monday, May 6, 2019, 18.30 – 22:30 (18:00 meeting point BBAW)



Experience Berlin by the luxury ship “Brasil” and discover new perspectives of the capital. Modern boat with an exclusively designed panorama salon at the bow. Together with the second salon it guarantees a simple, stylish elegance, maximum 130 seats. An outdoor area is of course also available. City cruise through the inner city via Mühlendamm Schleuse, Nicolai Quarter, Humboldt-Forum, Berlin Cathedral, Museum Island, Government Quarter, House of World’s Cultures), Schloss Bellevue, Schlossbrücke with view of Schloss

Charlottenburg and back. For further information please visit the www.sternundkreis.de

This reception is included in the registration fee.

IAA DINNER

The Regent Hotel Berlin

Tuesday, May 7, 2019, 19:00 – 22:00 (18:45 meeting point BBAW)



At its special location on the Gendarmenmarkt in Berlin-Mitte, the Regent Berlin convinces with a view of the magnificent 18th-century French cathedral and the famous concert hall. Perfect personal service and comfort in a stylish and noble ambience invite you to enjoy. The Salon Gontard offers an unforgettable experience for its guests, with authentic 17th-century interiors and festive atmosphere.

For further information please visit <https://www.regenthotels.com/de/regent-berlin/overview/about-the-hotel>

Fee: 120,00 €

This dinner is not included in the registration fee

HOTEL ACCOMODATION

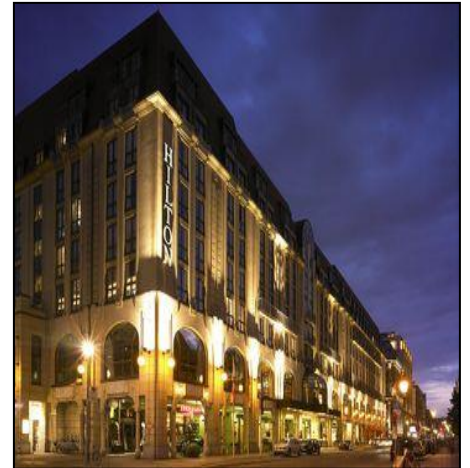
Berlin Hilton Hotel*****

The Berlin Hilton is one of the most well-known hotels of Berlin. It is located only 2-3 minutes from the symposium venue “Berlin Brandenburgische Akademie der Wissenschaften” (BBAW). Located right on the beautiful and cultural Gendarmenmarkt in the historical city centre, the Berlin Hilton is within walking distance to all well-known places in Berlin. The U2 underground train station “Stadtmitte” is right in front of the hotel and offers fast connections to all parts of the city and to the main railway stations.

Room rate: € 159.00 single room, incl. breakfast
€ 179.00 double room, incl. breakfast

Address: Mohrenstraße 30, 10117 Berlin

Internet: www.hilton.com



NH Hotel Berlin Mitte****

The NH Berlin Mitte is one of the well-known business hotels of Berlin, located right in the centre of the city, near Potsdamer Platz and Alexanderplatz and in direct neighbourhood to historical sights and the Friedrichstrasse shopping area. The U2 underground train station “Stadtmitte” is within 5 minutes walking distance, the beautiful Gendarmenmarkt and the symposium venue “Berlin-Brandenburgische Akademie der Wissenschaften (BBAW)” within less than 8 minutes walking distance.

Room rate: € 129.00 single room, incl. breakfast
€ 153.90 double room, incl. breakfast

Address: Leipziger Straße 106-111, 10117 Berlin

Internet: www.nh-hotels.com



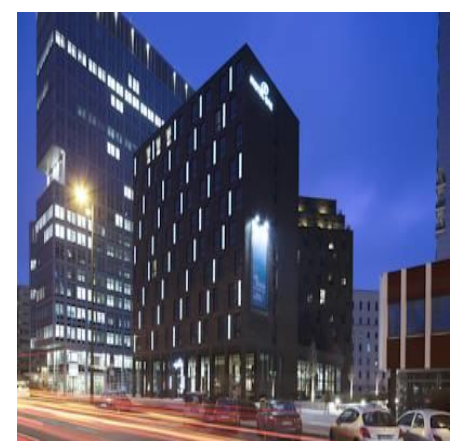
Motel One Berlin Spittelmarkt

Just 150 m from Spittelmarkt Underground Station, this non-smoking design hotel in the Mitte district of Berlin offers air-conditioned rooms, a 24-hour bar, underground parking and free Wi-Fi. Varied breakfast buffets are also available here. Gendarmenmarkt Square with the Symposium Venue is a 10-minute walk from the Motel One Spittelmarkt. If you prefer to use the public traffic you reach the symposium venue by using the Metro Line U2 (station “Spittelmarkt” to station “Stadtmitte”).

Room rate: € 90.50 single room, incl. breakfast
€ 123.00 double room, incl. breakfast

Address: Leipziger Str. 50, 10117 Berlin

Internet: www.motel-one.com



Hotel Room Rates

Hotel	Single Room	Double Room
Berlin Hilton (5*- hotel)	€ 159.00*	€ 179.00*
NH Hotel Berlin Mitte (4*- hotel)	€ 129.00*	€ 153.90*
Motel One Berlin Spittelmarkt	€ 90.50*	€ 123.00*

* credit card number required

Hotel Reservation Deadline: March 30, 2019

1. The prices indicated are per room per night and include breakfast, service and VAT.
2. Please send your Hotel Reservation as soon as you decide to participate in the symposium to ConTour GmbH. After the deadline for the hotel reservation, your room booking cannot be guaranteed.
3. Hotel reservation confirmation will be handled by ConTour GmbH, as well as the confirmation for participation in the symposium and exhibition by e-mail.

METHODS OF PAYMENT

The registration should be returned to ConTour GmbH with the appropriate payment enclosed. All payment due for registration and dinner must be in Euro and made payable to ConTour GmbH. The following methods of payment are acceptable:

1. **Credit card payment**
American Express, MasterCard and Visa are accepted. We need the name, the card number with proof number, the date of expiration and your signature (see the Registration Form).
2. **Bank transfer**
to: ConTour GmbH
Bank: Deutsche Bank PGK, Berlin, Germany
IBAN: DE93 1007 0024 0149 4384 02
BIC: DEUT DEBBER
Reference: 12th IAA Symposium and **name of the participant**

Please type or write ConTour GmbH, the bank name, IBAN, BIC, "12th IAA-Symposium" and name of participant on the bank transfer form. Please send a copy of the bank's receipt for remittance with your Registration Form in order to verify payment. Any bank charges are to be borne by participants.

Cancellation and Refund

Cancellation should be made in writing to ConTour, and the refund will be processed according to the following policies:

	Before March 31, 2019	After March 31, 2019
Registration Fee	60 % refund	No refund
Gala Dinner	Full refund	50 % refund

VISITING PROGRAM

Excursion to DLR-Site Berlin

May 10th, 09:00 – 13:00 (9:00 meeting point BBAW)

Welcome at DLR: The History of half a Century of space research in Berlin

Learn about the historical space research from the late 50ies up to today. Get an impressive overview of the variety of research subjects in Berlin. Discover relicts of international collaboration programs and have watch items of historic space missions.

Learn about the Insight mars mission and preparation of the ongoing challenging mercury mission. Fly over the Mars in 3D and colour.

See examples of hyperspectral imagery onboard the ISS or high resolution images from satellite.

Discover a century of Flight and 50 Years of Cosmic research at Adlershof.

**Deutsches Zentrum für Luft- und Raumfahrt (DLR) – German Aerospace Center |
Rutherfordstraße 2 | 12489 Berlin**

The bus tour to Berlin-Adlershof is included in the registration fee.