



SPACE TECHNOLOGY AND TELE-REACH: BENEFITING HUMANITY ON EARTH AND BEYOND

PRELIMINARY PROGRAM

17TH ISU ANNUAL INTERNATIONAL SYMPOSIUM

Strasbourg, Tuesday 5th – Thursday 7th March 2013

SPACE TECHNOLOGY AND TELE-REACH: BENEFITING HUMANITY ON EARTH AND BEYOND

SCOPE OF THE SYMPOSIUM

Each year, the International Space University (ISU) organizes a three day symposium addressing a topical theme from an interdisciplinary and international perspective. These symposia attract an audience of around 200 members of the space sector from agencies, industry and academia worldwide. Previous ISU symposia have addressed subjects as diverse as small satellite design and applications, future navigation systems, and the sustainability of space activities – see www.isunet.edu/previous-symposia.

Our next symposium, the seventeenth in a series, will address ‘Tele-reach’ a term we use to refer to technologies and applications which allow remote presence, participation, interaction or control. The emphasis here will be placed on exploring the role that space can play in broadening and sustaining the ‘reach’ of ICT (Information and Communication Technology) systems to benefit human-kind in areas such as education, healthcare and environmental management. Looking beyond the socio-economic benefits here on Earth we will widen the scope to include fields such as tele-presence and tele-operation of remote equipment both on Earth and in space.

This broad theme has much in common with our very first ISU Annual Symposium on ‘Space of Service to Humanity’. Huge advances have been made since the mid-90s in ICT technologies and in the application of satellite services. Where are we now and how can we extend tele-reach still further to benefit us all?

SYMPOSIUM STRUCTURE

There will be six half-day sessions as listed here. The Poster Session will be held in conjunction with a Reception on the first evening. Posters will then be prominently displayed throughout the next two days.

Tuesday 5th March

SESSION 1: Tele-Reach Needs, Current Provisions and Future Plans

SESSION 2: Tele-Education

EVENING: Poster Session and Reception

Wednesday 6th March

SESSION 3: Tele-Health

SESSION 4: Tele-Reach and the Environment

EVENING: Symposium Concert and Dinner

Thursday 7th March

SESSION 5: Political, Economic, Legal and Ethical Challenges

SESSION 6: Other Applications of Tele-Reach on Earth and in Space

All sessions will be held in plenary and will take place in ISU's Boeing Auditorium with a seating capacity for up to 250 participants.

English will be the working language, each speaker having 15 mins to present followed by brief questions. Panel Discussions at the end of each session provide opportunities for further questions and interactions among participants.

(Note: In the lists of presented papers and posters on the following pages only the main or contact author's name is given in the case of multiple inputs – full details of authors and affiliations will appear in the Final Program and Book of Abstracts)

TUESDAY

5TH MARCH 2012

Morning

08:15 › REGISTRATION OPENS

09:00 › OPENING REMARKS

- ▶ *Walter Peeters, President, ISU*
- ▶ *Vasilis Zervos, ISU Resident Faculty and Chair of Symposium Organizing Team*

OPENING KEYNOTE ADDRESS

- ▶ TBD

SESSION 1

TELE-REACH NEEDS, CURRENT PROVISIONS AND FUTURE PLANS

Chair: *Angie Bukley, ISU Dean and Chair of Program Committee*

- ▶ NASA Current Technology Development Work for Tele-reach Applications.
Karen Thompson, Chief Technologist, NASA Kennedy Space Center, USA
- ▶ Tele-reach: a Means for Achieving Sustainable Development Goals for ESA.
Nathalie Meusy, Head of Coordination Office on Sustainable Development, ESA and Gonzalo Martin de Mercado, ESA Tele-communications and Integrated Applications Department
- ▶ The Mars Curiosity Rover Mission: Remotely Operating a Science Laboratory on the Surface of Another Planet.
Jessica Samuels, Jet Propulsion Laboratory, USA
- ▶ Reach2020: Tele-Reach for the Global South.
Edu Aymerich, Phillippa Blaber, Scott Madry, International Space University
- ▶ Tele-Reach: One Domain or Many?
Michael Simpson, Executive Director, Secure World Foundation, USA
- ▶ The Global Earth Observation System of Systems (GEOSS).
Barbara Ryan, Secretariat Director of the Intergovernmental Group on Earth Observations (Invited)

SESSION 1 PANEL DISCUSSION

Chair: *Angie Bukley*

Panel Members: *Speakers of Session One*

13:00 › LUNCH

Afternoon

14:00 › SESSION 2 TELE-EDUCATION

Chair: *TBD*

- ▶ Introductory Remarks by Chair.
- ▶ Innovations in Satellite Tele-education in a Broadband Internet World.
Joseph Pelton, Former Dean, International Space University and Former Director of Strategic Policy and Director of Project SHARE, Intelsat (video link)
- ▶ Extending Tele-Reach Technologies to the Lunar Surface.
Jim Burke, The Planetary Society, USA and ISU MSc'13 students
- ▶ Benefits of the Venezuelan Space Programs in Tele-Health, Tele-Education, and Earth Observation Applications.
Raúl Hernández Guerrero, The Bolivarian Agency for Space Activities, Venezuela.
- ▶ Current Condition of Tele-Space-Education and its Vision.
Ejiro Hirohama and Yayoi Miyagawa, JAXA Space Education Center, Japan
- ▶ Tele-Education Growth in the African Continent.
Moshood Kareem, Nigerian Communications Satellite, Nigeria
- ▶ Training of Experts for Telemedical Centers: 12-Year Experience in Holding Telemedical Courses.
Oleg Atkov, V. Stolyar and Andrey Selkov, The Russian Association for Telemedicine, Moscow
- ▶ Research on Tele-education Based Satellite TT&C Training.
Chen Xingxing, Beijing Aerospace Control Center (BACC), China
- ▶ Three-Site Multipoint Tele-Education utilizing “HyperMirror” via KIZUNA.
Taiichiro Okubayashi, Graduate School of Human Sciences, Osaka University with 9 co-authors from Japanese universities and JAXA

SESSION 2 PANEL DISCUSSION

Chair: *TBD*

Panel Members: *Speakers of Session Two*

18:00 – 20:00 › RECEPTION AND POSTER SESSION

(see list of poster titles later)

WEDNESDAY

6TH MARCH 2012

Morning

09:00 › SESSION 3

TELE-HEALTH

Chair: *Oleg Atkov, Russian Association for Telemedicine and former cosmonaut*

- ▶ Introductory Remarks by Chair.
- ▶ An Overview of the Telemedicine Domain and the Potential Contribution of Space Technology.
Bianca Detsis, ISU MSc'11 graduate and Emmanouil Detsis, European Science Foundation, Strasbourg.
- ▶ Space Technology for Telemedicine to Support Health and Well-Being.
Giovanni Cannizzaro, Telespazio, Italy
- ▶ Satellite-based e-Health Solutions: Lessons Learned from Pilot Projects and Recommendations.
Khalifa Gaye and Patricia Martinez, Astrium Satellites, Toulouse, France
- ▶ Satellite Tele-medicine Network Design and Construction.
Geng Guoxuan and Zhang Xiaoguang, Beijing Institute of Tracking and Telecommunications Technology, China
- ▶ The State of Tele-Health and Lessons for the Space Industry.
Ruslan Skomorohov, Susan Simmons and Ted Chan, CSMG, Boston, USA
- ▶ The Satellite-enhanced eHealth for sub-Saharan Africa Programme.
Yuval Brodsky, Giorgio Parentela and Gonzalo Martín de Mercado, ESA and Alexander Horsch, Institute for Medical Statistics and Epidemiology, TU-München, Munich, Germany.
- ▶ Developing a Framework for Health IT Standardization in Latin America.
Arturo Serrano, Roberto Conte and Veronica Rojas, CICESE Research Center, Mexico; Amanda Gomez, Mexican Space Agency; Angelica Silva, Oswaldo Cruz Foundation, Brazil
- ▶ Tele-Diagnostics and Tele-Surgery for Remote Locations on Earth and in Space.
Christian Lüthen, Erasmus University Medical Center, Rotterdam, The Netherlands
- ▶ Safe over the Top – Surveillance, Search and Rescue in the Arctic.
Milan Cermack, Applied Space Technologies Ltd., Switzerland

SESSION 3 PANEL DISCUSSION

Chair: *TBD*

Panel Members: *Speakers of Session Three*

13:15 › LUNCH

Afternoon

14:15 › SESSION 4

TELE-REACH AND THE ENVIRONMENT

Chair: *TBD*

- ▶ Introductory Remarks by Chair.
- ▶ Designing a Microsatellite for Earthquake Prediction Research.
M.H.Entezari, Iranian Research Organization for Science and Technology (IROST), Iran
- ▶ Tele-Reach in Africa. Improving Farming and Healthcare
Hemil Modi, Chris Johnson and Ricardo Topham, ISU MSc'12 TP-Africa Team
- ▶ Use of Satellite Radar Altimetry on Water Resources Management in Nile River of Sudan.
Carlos Pascual and Hosham Munier Galal, Future University, Sudan
- ▶ Smart-Space: Towards the Internet of Everything in Space.
César Cárdenas, Tecnológico de Monterrey, Fernando Camacho and Javier Mendieta, Mexican Space Agency.
- ▶ Environmental Applications of Nigeriasat
Francis Chizea, Director – International Cooperation, National Space Research and Development Agency(NASRDA), Nigeria
- ▶ Brief Summary of ISU MSc TP-Arctic Team Project.

SESSION 4 PANEL DISCUSSION

Chair: *TBD*

Panel Members: *Speakers of Session Four*

18:00 › COACHES LEAVE FOR STRASBOURG CITY CENTER

19:00 › SYMPOSIUM CONCERT

20:00 › SYMPOSIUM DINNER

THURSDAY

7TH MARCH 2012

Morning

09:00 > SESSION 5

POLITICAL, ECONOMIC, LEGAL AND ETHICAL CHALLENGES

Chair: *Kai-Uwe Schrogl, Head of ESA Policies Department*

- ▶ Introductory Remarks by Chair.
- ▶ The Missing Link: Strategy and its Implementation for Space-Based Tele-Reach Programs.
John Sheldon, The Torricon Group, USA and Torsten Kriening, Kriening International, Germany
- ▶ Tele-Reality: How Space Technology Transforms Human Perceptions of Space, Time and Self.
Jacques Arnould, CNES, France
- ▶ Socio-economic Benefits of Satellite Services (Invited paper)
Aarti Holla-Maini, Secretary General, European Satellite Operators Association (ESOA)
- ▶ Ethical Considerations on Satellite Services (Invited Paper)
Jean-Paul Hoffmann, Vice President Corporate Communications, SES, Luxembourg
- ▶ Exploring Innovation Development and Funding within the Space Industry in Developing Nations.
Carla Sharpe, Foundation for Space Development, South Africa and Leslie-Jane Smith, Leuphana University, Germany
- ▶ Fulfilling the Legal Gaps of Tele reach Space Activities: the Legal Devil is in the (Legal) Details.
Maxime Puteaux, IDEST, Paris.
- ▶ Maritime Domain Awareness: Benefits and Opportunities for International Cooperation.
Jaisha Wray and Kimberly Coniam, U.S. Department of State
- ▶ The Mexican Space Agency's Policy on Cyber-health and its Impact in the Mexican Society.
Amanda Gomez, Javier Mendieta and Celso Gutiérrez, Mexican Space Agency

SESSION 5 PANEL DISCUSSION

Chair: : *Kai-Uwe Schrogl, ESA*

Panel Members: *Speakers of Session Five*

13:00 > LUNCH

Afternoon

SESSION 6

OTHER APPLICATIONS OF TELE-REACH ON EARTH AND IN SPACE

Chair: *Ray Johnson, Chief Technology Officer, Lockheed Martin Corporation*

- ▶ Introductory Remarks by Chair.
- ▶ Some Thoughts on Tele-reach on Earth, in Earth Orbit and on Mars.
Michael Rycroft, CAESAR Consultancy, Cambridge, UK and ISU
- ▶ Surface Tele-Robotics from the ISS.
Andrew Henry, MSc'12 Graduate
- ▶ Tele-presence and Tele-robotics for Asteroid Utilization.
Michael Wright and Mark Lupisella, NASA Goddard SFC, USA
- ▶ Online Control of Unmanned Lunar Rover Based on Virtual Reality.
Cheng Yang, Beijing Aerospace Control Center, China
- ▶ Putting Human Cognition and Awareness on Other Worlds.
Dan Lester, Department of Astronomy, University of Texas, USA (video link)
- ▶ Research on VR-based Tele-operation Technique.
Yuhan Yan, Huiying Zheng, Huiping Shang, Beijing Institute of Tracking and Telecommunications Technology, China
- ▶ NASA's Space Launch System: Positioning Assets for Tele-Robotic Operations.
Todd May, Stephen Creech and Kimberly Robinson, NASA MSFC, USA
- ▶ Concepts Leading to a Sustainable Architecture for Cis-Lunar Development.
K. Klaus and K. Post, The Boeing Company with S. J. Lawrence, Arizona State University, USA
- ▶ Space-Avatar: A New Space Exploration Paradigm Using Future ICT Technologies.
César Cárdenas, Tecnológico de Monterrey, Roberto Hernández, Javier Mendieta, Mexican Space Agency

SESSION 6 PANEL DISCUSSION

Chair: *Ray Johnson, Lockheed Martin Corporation*

Panel Members: *Speakers of Session Six*

CLOSING REMARKS

Walter Peeters, ISU

(END AT 17:00)

POSTER PAPERS

► Typhoon in Philippines: Use of Geospatial Technique in Forecasting for Extent of Impact, for Safety and Proper Planning.

Olubunmi Akinwumi, NARSDA, Nigeria.

► Bio-XAWPs: Biomimicry in Aerostatic Wind Power Generator Parks for Aerospace Technology Development and High Social Impact.

César Cárdenas, Tecnológico de Monterrey and Javier Mendieta, Mexican Space Agency.

► SHINE: Space for a Health Information Network on Earth.
Bianca Detsis, ISU MSc'2011.

► Research on Tele-Reach Management of China's Aerospace TT&C System.

Fei Fan, Hui Zhao and Naiwei Wang, Beijing Institute of Tracking and Telecommunication Technology with Lue Chen, Beijing Aerospace Control Center, China.

► Research on the Role of Tele-Reach in Arctic Navigation and Resources.

ISU MSc'13 TP-Arctic Team.

► Exploring Mars from Mars Orbit.

ISU MSc'13 TP-Mars-X Team.

► An Intelligent Traffic Information System Based on Tele-reach Technology.

Feng Jianguang, Beijing Institute of Tracking and Telecommunications Technology, China

► New Future Spacecraft Navigation Tool - Interferometry Technology Based on Antenna Array.

Lue Chen, Geshi Tang, Songtao Han, Songjie Hu, Ming Chen, Mei Wang, Tianpeng Ren, Li Li and Huicui Liu. Science and Technology on Aerospace Flight Dynamics Laboratory and Beijing Aerospace Control Center, China.

► Space Situation Monitoring Laboratory: An Integrated Web-Based Environment for Space Environment Information and Analysis.

Justin McNeill, John Coggi, William Ailor, R. L. Swartz, R. P. Patera, The Aerospace Corporation, USA.

► GEO Debris Explorer of the Space Situation Monitoring Laboratory.

Justin McNeill, Eyal Amir, George Chao, John Coggi, Brian Hansen, Raymond Swartz, William Ailor, The Aerospace Corporation, USA.

► A Swift SIFT (Space Incident Flagging Technique) for Satellite Event Detection.

Justin McNeill, John Coggi, Raymond Swartz, William Ailor, R. P. Patera, The Aerospace Corporation, USA.

► Geoinformatics-Based Mapping of Cultural Heritage of Sudan.

Carlos Pascual and Hassan Babiker, Future University, Khartoum, Sudan.

► The Mobile Virtual Space Operation Centre Design in Conception.

Pengyue Kwan and Zhang Jixia, Beijing Aerospace Control Center, China.

► Mobile Telemedical Kit with Headpiece for Audio and Video Data Transmission and Operator's Support System.
O. Atkov, V. Stolyar, A. Panfilov, K. Komissarov, Y. Tschmister, Y. Kudriashov, The Russian Association for Telemedicine.

► Potentials and Prospects of Tele-Health in Management of Public Health, Emergency and Disasters in Developing Countries.

Solomon B. E. and Ajigbon I., National Space Research and Development Agency, Nigeria.

► How Tele-Health can Improve Healthcare in Africa: The Telemedicine Van.

Ricardo Topham, Christopher Johnson and Hemil Modi, ISU MSc'12 Graduates

► Study on Tele-Information Transmission Technologies Based on Distributed Satellite Constellation Networks.
Wan Peng, Ye Jian-she, Song Shi-jie, Beijing Institute of Tracking and Telecommunications Technology, China.

► Plus TBD posters to be selected from Master of Space Studies Students, KU Leuven, Belgium.

► Plus TBD posters from European students selected through ESA's Conference Opportunities for Sponsored Students (ECOSS) Programme.

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Angie Bukley, ISU Dean

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Cancellations shall be made in writing to ISU. Refunds will be made according to the following policy:

- ▶ For notice of cancellation received before 22nd February 2013, a refund will be made after deduction of 10% of the registration fee.
- ▶ No refund will be made for cancellation received after 22nd February 2013 unless there is a valid reason (Medical issue, Family death, Visa issues, Job issues) in which case the 10% deduction will be applied as above.

The registration fee covers:

- ▶ Access to all conference facilities during the Symposium.
- ▶ Transport to/from the city center.
- ▶ Welcome reception, lunches and refreshments over the three days.
- ▶ Symposium Dinner and Concert.
- ▶ Book of abstracts
- ▶ Access to all presented papers

ACCOMMODATION

At www.isunet.edu/symposium/hotels you will find a table with the options we have taken in some Strasbourg hotels, where you will be able to book at special rates. Please, make sure to make your reservations before the booking deadlines. Further hotels are listed at the local tourist office website at www.otstrasbourg.com.

Hotels Combined provides a price comparison system, and there is a 10% rebate on accommodation cost available to participants of the International Space University's Symposium who book through one of their participating websites. You can find out more information from their conference support scheme pages. To take advantage of this, you will need to book through their list of hotels in Strasbourg at www.hotelscombined.com/City/Strasbourg.htm

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For your convenience, register online directly at www.isunet.edu

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I wish to register for the Symposium "Space Technology and Tele-Reach: Benefiting Humanity on Earth and Beyond" for the following fee:

Before the 8 th February 2013:	<input type="checkbox"/> 600 € / <input type="checkbox"/> US\$ 800
After the 8 th February 2013:	<input type="checkbox"/> 800 € / <input type="checkbox"/> US\$ 1050
Retired / Alumni:	<input type="checkbox"/> 400 € / <input type="checkbox"/> US\$ 500
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Social Event

A concert and a conference dinner are included in the registration fees for each of the participants of the Symposium. This social event will take place on March 6th 2013. If you wish to bring a guest, an additional charge of 20 € / US\$ 25 will be requested.

Please, tick the relevant information:

- Yes, I will attend the Social Event
 No, I will not attend the Social Event
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Do you have any special dietary needs (please circle):
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- Checks (in EUR or US\$ only) made payable to “International Space University”.
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STRASBOURG AND THE SURROUNDING REGION

There will be an opportunity to sample some of the delights of Strasbourg itself on the second evening when all participants are invited to join us at a short concert in a historic church before enjoying Alsatian cuisine at the Symposium Dinner. The city and its surroundings offer a wide range of attractions to suit all tastes throughout the year. Those who don't already know the region (and those who do!) may well be tempted to extend their stay into the weekend to discover more of its character and charm.

Take a look at the tourist office website (www.otstrasbourg.fr) to find out more about the many historic and cultural opportunities on offer including the famous cathedral, the 'European district', where many international institutions are based, and many other interesting places to visit while you are here.

INTERNATIONAL SPACE UNIVERSITY

International Symposium

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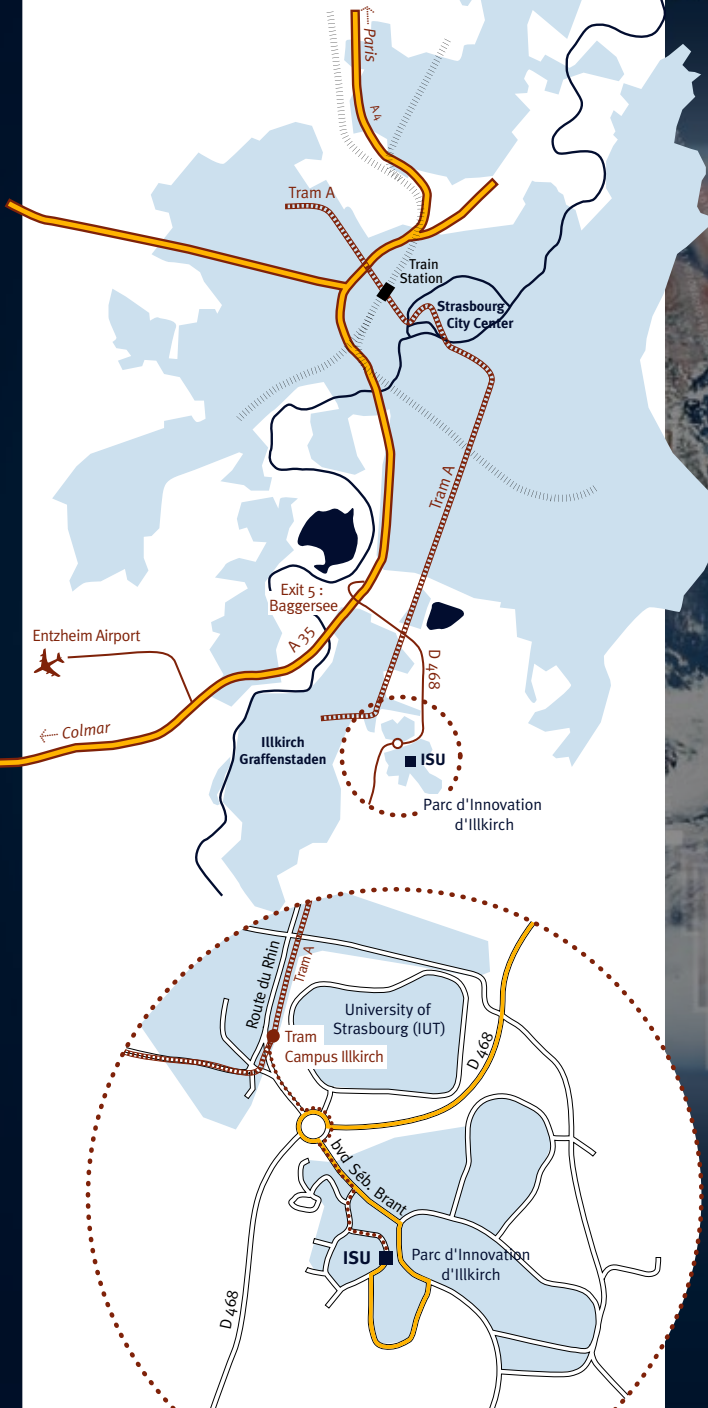
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INTERNATIONAL SPACE UNIVERSITY



HOW TO GET TO ISU

The ISU Central Campus is located in the Parc d'Innovation at Illkirch-Graffenstaden, a town in the southern part of the Strasbourg Urban Community. It is 15-20 minutes from the center of Strasbourg by car, 30-35 minutes by public transport.

► From Entzheim International Airport, it is a 15-20 minute-drive by car/taxi. From the airport, a taxi will cost approximately 25-30 Euro (rates are higher at night and on weekends/ holidays). There is a regular train service from the airport to Strasbourg main station. From there take tram A direction Illkirch to tram stop "Campus d'Illkirch". Then follow the directions given under "Public Transport".

► By Car: from the center of Strasbourg, take the A35 (highway) southwards in the direction of Colmar. (See continuation of directions after "From the Airport".)

► From the Airport, take the same highway (A35) northwards, direction Strasbourg. In both cases, take exit 5, Illkirch Baggersee. At the traffic lights, go straight ahead and continue straight on until you reach a roundabout (traffic circle). Take the 4th turning into the Parc d'Innovation. Continue on Blvd. S. Brant until you reach the next roundabout. Take the first right on the roundabout and you will see the new ISU campus on your right. Take the first turning to your right (the Holiday Inn will now be on your left), two more right turns and you are on the ISU car-park!

► By Public Transport, take the "A" tram from the railway station or from the city center, direction Illkirch, and get off at the Campus d'Illkirch station (the tram runs from 4:30 a.m. to 0:30 a.m., with one tram every four minutes at peak hours). Turn left and walk to the roundabout, cross over. The building on your left is the Pole API. Continue for about 15 meters on Blvd. S. Brant, cross the street to get to the pedestrian path adjacent to the new ISU campus which should be visible on your right.



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