14th International Symposium and accompanying Exhibition on Sophisticated Car Safety Systems

Mannheim, Germany
Congress Center “Rosengarten”

2018, November 26-28
Program Committee

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Volkswagen AG

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Daimler AG

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Prof. Dr. Peter Elsner
Fraunhofer ICT

Chairman of the Symposium

Dr. Jochen Neutz
Fraunhofer ICT
Welcome

The safety of all road users is a growing concern world-wide, while transportation faces a multitude of challenges but also opportunities such as new drive technologies or automated driving. Within this fast developing field, information is the key enabler of innovation and cutting-edge technology to maintain and improve road safety. The 14th AIRBAG 2000+ Symposium in 2018 will again be the meeting place for engineers, scientists, legislators, managers and marketing experts to exchange information, to make and improve contacts, to stimulate further progress and to promote integral safety for road users on an impartial platform.

The Fraunhofer Institute for Chemical Technology ICT is the leading independent research and development facility for airbag technology and testing. As a division of Fraunhofer, Europe’s largest organization for applied and contract research, the Fraunhofer ICT offers a unique event for the automobile industry, suppliers and public authorities.

Welcome to Mannheim, Germany, and the world of Airbag 2018.

Dr. Jochen Neutz
Chairman of the Symposium
Registration

Please return the enclosed registration form or Online: www.ict.fraunhofer.de/airbag2018

You will then receive an invoice.

Registration fees (including proceedings, coffee breaks, lunch, evening receptions), depending on date of arrival of registration form at Fraunhofer ICT

* up to November 12, 2018  
  EURO 950,– (incl. 19 % VAT)

* up to November 19, 2018  
  EURO 1.050,– (incl. 19 % VAT)

Participation cannot be guaranteed for registrations arriving after November 19, 2018. A fee of EURO 500,– will be charged for cancellations after November 19, 2018. No-shows will be charged the complete fee.

Accommodation

www.ict.fraunhofer.de/airbag2018accomodation

Conference Office

is located in the foyer of the Conference hall and may be reached from November 28 to November 30 by

Phone +49 (0)621-4106-5030

Check In / Welcome Reception

Please check in at the conference office on Monday, November 26 between 13.00 and 20.00 h. All participants are cordially invited to the Welcome Reception in the foyer of the Conference hall on Monday, November 26, 18.00 – 21.00 h.

Conference Languages

English, German – Simultaneous Interpretation

Proceedings

One copy of the proceedings is included in the registration fee. Additional copies EURO 100,–.
Alt Technologies BV  
Utrecht, NL

APTIV  
Guyancourt, F

Autoliv Inc.  
Stockholm, SE

Continental Automotive GmbH  
Regensburg, D

Daicel Safety Systems Europe  
Zarow, PL

Daimler AG  
Sindelfingen, D

Dow Silicones Belgium SPPL  
Seneffe, B

Dürkopp Adler Aktiengesellschaft  
Bielefeld, D

Electrovac Hermetic Packages  
Salzweg, D

Elkem Silicones France SAS  
Lyon, F

GFU-Maschinenbau GmbH  
Bitburg, D

Gesellschaft für Umweltsimulation e.V.  
Pfinztal, D

Gütermann GmbH, Tech Tex / Automotive Zwicky  
Gutach im Breisgau, D

Hirtenberger Automotive Safety GmbH & Co KG  
Hirtenberg, A

INVIDIA Textiles (U.K.) Ltd.  
Gloucester, UK

iSi Automotive Austria GmbH  
Wien, A

Jinzhou Jinheng Automotive Safety Systems  
Jinzhou, PRC

Joyson Safety Systems Aschaffenburg GmbH  
Aschaffenburg, D

Mikron Automation  
Boudry, CH

Nippon Kayaku  
Tokyo, JAP

PFAFF Industriesysteme und Maschinen GmbH  
Kaiserslautern, D

PFAFF Industriesysteme und Maschinen GmbH, Zweigniederlassung KSL  
Lorsch, D

PPI Adhesive Products  
Banská Bystrica, SK

Quadrant CMS N.V.  
Tielt, B

Robert Bosch GmbH  
Stuttgart, D

SCHOTT AG  
Landshut, D

Schreiner Group GmbH & Co. KG ProTech  
Oberschleißheim, D

ZF Friedrichshafen AG  
Friedrichshafen, D
Monday, November 26

**Workshops (in GERMAN only)**

**13.30 – 18.00  WS1** Workshop “Retten ohne Risiko!” für Rettungskräfte mit “Airbag-Update”, Einsatzberichten und Erfahrungsaustausch
POC: Rolf.Erbe@berliner-feuerwehr.de
Teilnahmegebühr: EURO 119,- inkl. MWSt.
Frei für Teilnehmer des airbag-Symposiums.
Begrenzte Teilnehmerzahl, Anmeldung formlos an manuela.wolff@ict.fraunhofer.de

**13.30 – 17.30  WS2** Expertenmeeting »Berliner Erklärung zur Fahrzeugsicherheit« des VDI – Potenziale und Grenzen des Automatisierten Fahrens
Programm und Anmeldung unter www.vdi.de/ef-berliner-erklärung

**18.00 – 21.00** Welcome Reception for all participants (Symposium, Workshop, Exhibition)
Tuesday, November 27

08.00 – 08.15  
WELCOME AND OPENING  
J. Neutz  
Chairman of the Symposium  
B. Hefer  
Moderator of “airbag 2018”  
Fraunhofer ICT, Pfinztal, D

08.15 – 09.00  
V1  
KEYNOTE  
THE FUTURE CHALLENGES OF VEHICLE SAFETY  
M. Rabe  
SEAT S.A., Martorell, E

1ST SESSION: GLOBAL CHALLENGES AND REQUIREMENTS  
Session Responsible: Michael Fehring  
Daimler AG, Sindelfingen, D

09.00 – 09.25  
V2  
IAAT – ACCIDENT RESEARCH PROGRAM IN BRAZIL  
O. Schulze  
Joyson Safety Systems Brazil, Jundiai, BR  
T. Lich  
Robert Bosch GmbH, Stuttgart, D

09.25 – 09.50  
V3  
HOW CAN VEHICLE SAFETY CONTRIBUTE TO INCREASE ROAD TRAFFIC SAFETY IN INDIA?  
T. Lich, J. Mönnich, A. Georgi  
Robert Bosch GmbH, Stuttgart, D  
G. Kumaresh  
Robert Bosch Engineering and Business Private Solution Ltd., Bangalore, IND

09.50 – 10.15  
V4  
EURO NCAP, IN PURSUIT OF VISION ZERO  
R. Schramm, M. van Ratingen  
Euro-NCAP, Brussels, B

10.15 – 10.40  
V5  
IIHS RESEARCH TOWARD THE DEVELOPMENT OF AN UPDATED SIDE IMPACT CRASH TEST PROGRAM  
B. Mueller  
Insurance Institute for Highway Safety, Ruckersville, USA

10.40 – 11.10  
Coffee Break
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<td>12.00 – 13.30</td>
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<td>14.45 – 15.10</td>
<td>V8</td>
<td>A FAR SIDE OCCUPANT PROTECTION SYSTEM</td>
<td>B. Pipkorn, K.-J. Larsson Autoliv Development AB, Vargarda, SE</td>
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<td>15.10 – 15.35</td>
<td>V10</td>
<td>MASS FLOW DETERMINATION OF AIRBAG INFLATORS</td>
<td>P. Yurrita, J. Neutz, T. Klahn Fraunhofer ICT, Pfinztal, D N. Edelmann AUDI AG, Ingolstadt, D</td>
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V11 INCREASING THE PREDICTION QUALITY OF AIRBAG SIMULATION MODELS
M. Lich
Volkswagen AG, Wolfsburg, D
M. Kröger
TU Bergakademie, Freiberg, D

V12 INTEGRATED SAFETY FOR AUTOMATED DRIVING
S. Linkenbach, K. Rink, B. Peters
Continental, Frankfurt, D

V13 INTEGRATED SAFETY – ENABLING FOR TECHNOLOGIES FOR FUTURE VEHICLES
F. Laakmann, U. Class, M. Seyffert
ZF Friedrichshafen AG, Alfdorf, D

V14 FUTURE PASSIVE SAFETY NEEDS FOR PASSENGER CAR OCCUPANTS: PREDICTED INJURY PATTERNS AND POSSIBLE COUNTERMEASURES
M. Östling, P. Puthan, H. Jeppsson, N. Lubbe
Autoliv Development AB, Vargarda, SE

Awards

Evening Reception (in the foyer of the Conference Hall) with entertainment by “The Speedos”
### 5th SESSION: PASSIVE SAFETY ASPECTS OF AUTOMATED DRIVING

Session Responsible: Joachim Lodemann
Autoliv, Elmshorn, D

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<tr>
<td>8.00</td>
<td>V15</td>
<td>AUTOMATED VEHICLES – WHO NEEDS BELTS AND AIRBAGS? PASSIVE SAFETY APPROACH DERIVED FROM EXPECTED ACCIDENT SITUATIONS</td>
<td>M. Kühn, J. Bende</td>
<td>GDV, Berlin, D</td>
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<td>8.25</td>
<td>V16</td>
<td>DEVELOPMENT OF OCCUPANT RESTRAINT SYSTEMS FOR FUTURE SEATING POSITIONS IN FULLY OR SEMI AUTONOMOUS VEHICLES</td>
<td>A. Huf, S. S. Velavan</td>
<td>BMW AG, München, D</td>
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<td>8.50</td>
<td>V17</td>
<td>STUDY OF THE OCCUPANT INJURY TENDENCY BY THE CHANGE OF OCCUPANT POSTURE IN AUTOMATED CAR</td>
<td>H. Ida</td>
<td>Toyoda Gosei Co. Ltd., Aichi, JAP</td>
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### 6th SESSION: SENSORS

Session Responsible: Clemens Willke
Robert Bosch GmbH, Stuttgart, D

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<td>9.15</td>
<td>V18</td>
<td>OCCUPANT SAFETY MONITOR: IMPORTANT INPUT FOR INTEGRATED SAFETY</td>
<td>A. Forster, D. Zittlau</td>
<td>Continental, Regensburg, D</td>
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<td>9.40</td>
<td>V19</td>
<td>INTERIOR SENSING AS ENABLER FOR OCCUPANT SAFETY AND COMFORT IN AUTONOMOUS VEHICLES</td>
<td>P. Dreuw, A. Leurs</td>
<td>Robert Bosch GmbH, Hildesheim, D, Renningen, D</td>
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<td>10.05 – 10.30</td>
<td>V20</td>
<td>FUTURE STEERING WHEELS AND SEATBELTS: OCCUPANT STATE SENSING AND TACTILE FEEDBACK</td>
<td>J. Karlsson, Autoliv Development AB, Vargarda, SE</td>
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<td>11.00 – 11.25</td>
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<td>SENSOR PERFORMANCE IMPROVEMENT AND DATA FUSION ENHANCES PRE-CRASH MANAGEMENT</td>
<td>H. Spies, M. Spies, Ingenieurbüro Spies, Hohenwart, D</td>
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<td>11.50 – 12.15</td>
<td>V23</td>
<td>PRE SENSE SIDE FOR ADVANCED OCCUPANT PROTECTION IN SIDE COLLISIONS</td>
<td>C. Weiss, S. Katzenbogen, AUDI AG, Ingolstadt, D, T. Störmer, Automotive Safety GmbH, Gaimersheim, D</td>
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<td>Automotive Technologies International, Miami, USA</td>
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<td>Shanghai East Joylong Motor Airbag Ltd, Shanghai, PRC</td>
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<td>National Academy of Sciences, Kiew, UKR</td>
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<td>Institute de Recherche Dupuy de Lome IRDL, Brest, F</td>
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<td>Fraunhofer ICT, Pfinztal, D</td>
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<td>14.55 – 15.20</td>
<td>V27</td>
<td>LESSONS LEARNED FROM INFLATOR FIELD ISSUES</td>
<td>B. Schubert</td>
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<td>TK Global, Romeo, USA</td>
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<td>15.20</td>
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<td>Closing Remarks</td>
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Posters will be presented in the Foyer of the Conference Hall during the Symposium. A special **POSTER SESSION** will be held on Tuesday, November 27, 11.10-12.00 h. During this time authors should be present for discussion at their posters.

### RESTRAINT SYSTEMS AND MODULES

**P28**  **TOWARD AUTONOMOUS VEHICLES: BASIC AERODYNAMIC BACKGROUND FOR NOVEL AIRBAG INFLATION SYSTEMS**  
D. Breed  
Automotive Technologies International Inc., USA  
S. Zhang  
Shanghai East Joylong Motor Airbag Ltd., PRC  
N. Yurchenko, G. Voropaiev, N. Rozumnyuk, P. Vynogradskyy, Y. Zagumennyy, E. Sierra, K. Kuzmenko, Y. Paramonov, A. Koshil, V. Tsymbal  
Institute of Hydromechanics, National Academy of Sciences, UKR

**P29**  **INFLATOR PERFORMANCE OPTIMIZATION WITH NEW PAB CONCEPT FOR OMDB, LRD**  
Raeick Jang, Yoo Hoon Choi, Doo Won Yang, Ga Ram Jeong, Seok Min Lee  
Hyundai Mobis Co. Ltd., Yongin-Si, ROK

**P30**  **NOVEL SIDE AIRBAG**  
B. Pipkorn  
Autoliv Development AB, Vargarda, SE

**P31**  **DEVELOPMENT OF SIDE IMPACT AIRBAG SYSTEM FOR THORAX-PELVIS PROTECTION**  
R. Jabbari, J. Sajjadi  
Andisheh Industrial Group, Babolsar, IR

**P32**  **INVESTIGATION THE EFFECT OF NEW DESIGN OF TETHER FOR DRIVER AIRBAGS AND USE OF TWIN CHAMBER AIRBAG ON DRIVER SAFETY ENHANCEMENT**  
M.J. Sajjadi, M. Ghanbarnia Sooteh, Z. Kelij  
Andisheh Industrial Group, Babolsar, IR

**P33**  **DESIGN CONSIDERATION OF THE PASSENGER AIRBAG GEOMETRY**  
M. Ebrahimi  
Andisheh Industrial Group, Babolsar, IR
P34  A DOCUMENTED WORK EXPERIENCE: DESIGN AND DEVELOPMENT OF AIRBAG SYSTEM COMPLIES WITH EURO NCAP REQUIREMENT FOR THE FIRST TIME IN THE MIDDLE EAST
M.H. Rajani, R. Rojaei, S.M. Pourhosseini Jorsheri
Andisheh Industrial Group, Babolsar, IR

P35  A STUDY OF THE REAR EXTERNAL AIRBAG TO ABSORBING THE REAR-END COLLISION ENERGY
Jiwoon Song, Sang Won Hwangbo, Hae Kwon Park, Kyu Sang Lee, Man Suk Bae, Jae Jun Harm, Yong Sun Kim, Taewook Jung
Hyundai MOBIS, Yongin-si, ROK

P36  „IF IT HAPPENS ON THE OTHER SIDE…” – INVESTIGATION OF NEW EURO NCAP FAR-SIDE SIDE IMPACT REQUIREMENTS
K. Hallbauer, U. Dierks, A. Riedel
Joyson Safety Systems, Ulm, D
I. Kalliske
Joyson Safety Systems, Berlin, D

P37  A STUDY ON THE MECHANISM OF REDUCING THE RESIDUE OF AUTOMOBILE DRIVER AIRBAG
Shu Jun-Ling
Hubei Institute of Aerospace Chemical Technology, Xiangyang, PRC

P38  THE TRUTH BEHIND MYTHS IN VEHICLE SAFETY OR WHY EURO-NCAP HAS TO BE REVISED
W. Langner
Mathematics in Vehicle Safety, Wolfsburg, D

P39  KNEE AIRBAG DEVELOPMENT PROCESS AUTOMATION AND OPTIMISATION
A. Mugnai
ESTECO, Trieste, I
A. Diederich
Toyoda Gosei, Saarbrücken, D

P40  ENHANCED ROLLOVER DISCRIMINATION METHOD WITH MULTI-AXIS SENSOR
Taewon Park, Sughyun Jeong, Seonghun Lee
Hyundai Mobis Co. Ltd., Yongin-Si, ROK

P41  DEVELOPMENT OF THE MUSCLE TONE DUMMIES
H. Ida
Toyoda Gosei Co. Ltd., Aichi, JAP
P42 CHARACTERIZATION OF AIRBAG FABRICS SUBJECTED TO MULTI-BIAXIAL LOADING RATIOS AND ELEVATED TEMPERATURES
F. Köble, S. Rodinger, W. Harwick, M. Boljen
Fraunhofer EMI, Freiburg, D

P43 TOWARDS TRANSIENT REPRESENTATIONS OF INFLATOR EXIT GAS TEMPERATURE INCORPORATED WITH CFD SIMULATIONS
C.-Y. Chang, L. Kyriakidis, T. Laufer
Joyson Safety Systems, Aschaffenburg, D

P44 NEW LEVELS OF AIRBAG PERFORMANCE AND COMPLIANCE TESTING
B. Streich
HuDe GmbH, Erkelenz, D

SIMULATION

P45 DEVELOPMENT OF A MASS-SPRING-DAMPER MATHEMATICAL MODEL FOR A VEHICLE CRASH ANALYSIS
S.M. Pourhosseini Jorsheri
Andisheh Industrial Group, Babolsar, IR

P46 NUMERICAL INVESTIGATION AND EMPIRICAL MODELING OF FILTER IMPACT IN INFLATOR APPLICATIONS
C.-Y. Chang, M. Amthor, J. Braun
Joyson Safety Systems, Aschaffenburg, D

P47 ONE DIMENSIONAL BALLISTIC MODELING OF MULTIPLE-LOADING INITIATORS FOR AIRBAG INFLATOR APPLICATIONS
C.-Y. Chang, T. Moradiya
Joyson Safety Systems, Aschaffenburg, D
M. De Boni, D. Riese, K. Mader-Arndt
TAKATA Ignition Systems, Schönebeck, D

INTEGRATED SAFETY / AUTONOMOUS DRIVING

P48 MAKING INTEGRATED OCCUPANT SAFETY SYSTEMS ASSESSABLE – VIRTUAL ASSESSMENT APPROACH FOR VARIABLE SEATING POSITIONS AND PRE-CRASH CONDITIONS
P. Luttenberger, W. Sinz
Technische Universität Graz VSI, Graz, A
G.A. D’Addetta, H. Freienstein
Robert Bosch GmbH, Stuttgart, D

P49 DATA RECORDING FOR AUTOMATED DRIVING
K. Heyer, M.O. Nilsen
Robert Bosch GmbH, Heilbronn, D
P50 **Future Steering Wheel Concepts**  
M. Schledorn  
ZF Friedrichshafen AG, Aschaffenburg, D

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**PYROTECHNIC**

P51 **PROPELLANT IGNITION AND EARLY COMBUSTION AT LOW PRESSURE**  
N. Daviot, I. Masquelier, R. Andry  
Autoliv Livbag, Pont-de-Buis, F  
S. Kerampran, J. Leclanche  
Institut de Recherche Dupuy de Lome IRDL, Brest, F

P52 **STUDY ON THE SAFETY AND PERFORMANCE OF GAS GENERANT WITH WATER-SOLUBLE AP PROCESS**  
Wang Xiaqiang, Zhang Ning, Wang Xingkui, Yao Jun  
Hubei Institute of Aerospace Chemotechnology, Xiangyang, PRC  
Hou Jingjing  
Hubei Hangpeng Chemical Power Technology Co. Ltd., Xiangyang, PRC

P53 **ENVIRONMENTAL AGING OF BASIC COPPER NITRATE**  
S. Taylor, C. Huff, B. Hart, G. Ramminger  
The Shepherd Chemical Company, Norwood OH, USA

P54 **THE DEGRADATION MECHANISM OF GUANIDINE NITRATE BASED GAS GENERANT**  
Y. Nishiwaki, M. Kumasaki  
Yokohama National University, JAP

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**COMPONENTS**

P55 **VARIANT-ADAPTIVE HOT GAS PROCESSING FOR AIRBAG SYSTEMS**  
N. Komorek, N. Beckers  
Filtertechnik Europe GmbH & Co. KG, Heinsberg, D  
Li Ronggang  
Baoding Filter Equipment Co. Ltd., Baoding, PRC

P56 **ADVANCES IN LOW COAT WEIGHT SILICONE COATINGS FOR AIRBAGS**  
E. Pouget, M. Slaviero, M. Zhou  
Elkem Silicones, Saint Fons, F

P57 **SEALING SEWING SEAMS OF CURTAIN AIRBAG**  
M.J. Sajjadi, M. Sadafi  
Andisheh Industrial Group, Babolsar, IR
HOW TO FIND THE VENUE

Getting to the Congress Center Rosengarten Mannheim

Travelling by car
From the A6 or A5 at the Mannheim or Heidelberg motorway intersection, continue towards "Mannheim-Mitte". You will reach the Rosengarten and the Dorint Congress Hotel via the Augustaanlage.

Travelling by train, urban train or bus
Mannheim is an ICE/IC junction station. There is a direct ICE connection from Mannheim to Basel, Berlin, Cologne, Düsseldorf, Frankfurt am Main, Frankfurt am Main Airport, Freiburg, Hamburg, Munich, Paris, Stuttgart, and many other cities.
You can reach the Rosengarten by taking the following tram routes:
Route 3, travelling towards Sandhofen, "Wasserturm" stop
Route 4, travelling towards Käfertal / Heddesheim, "Wasserturm" stop
Route 5, OEG travelling towards Viernheim-Weinheim, "Rosengarten" stop
You can reach the Rosengarten by taking the following bus routes:
Route 60, travelling towards Mannheim, Lanzvilla, "Wasserturm" stop
Route 63, travelling towards Lindenhof, Pfalzplatz, "Wasserturm" stop
Route 64, travelling towards Käfertal, OEG Station, "Wasserturm" stop

Travelling by plane
From Frankfurt Airport, a Lufthansa bus runs every hour to the Lufthansa Terminal.
Mannheim is an ICE/IC junction station. There is a direct ICE connection from Mannheim to Basel, Berlin, Cologne, Düsseldorf, Frankfurt am Main, Frankfurt am Main Airport, Freiburg, Hamburg, Munich, Paris, Stuttgart, and many other cities.
The Rosengarten is a five minute walk (walking towards the city centre) from the main railway station.
Rhein-Neckar–Air offers several daily round-trip flights between Mannheim and Berlin. Free parking and short distances within Mannheim city makes your arrival relaxed and easy.

Contact
m:con – mannheim:congress GmbH
Rosengartenplatz 2
D-68161 Mannheim
Phone:+49 (0)621 4106-123/-125
Fax:+49 (0)621 4106--80123/-80125
contact@mcon-mannheim.de
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Rosengarten Mannheim

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14th International Symposium and Exhibition on Sophisticated Car Occupant Safety Systems

Company / Authority / Complete Billing Address

Last name

First name

Title / Position

I will pay the registration fee upon receipt of the invoice.

It is agreed that pictures taken during this event may be published.

VAT-No. (European countries only)

E-mail

Phone no.

Fax no.

Participation (please tick)

Welcome Reception*

☐ Monday, November 26, 6.00 p.m.

* included in the registration fee

Fax +49 (0) 721 / 4640-120

November 26-28, 2018
Mannheim, Germany