

PASS 2023

The 16th International Personal Armour Systems Symposium

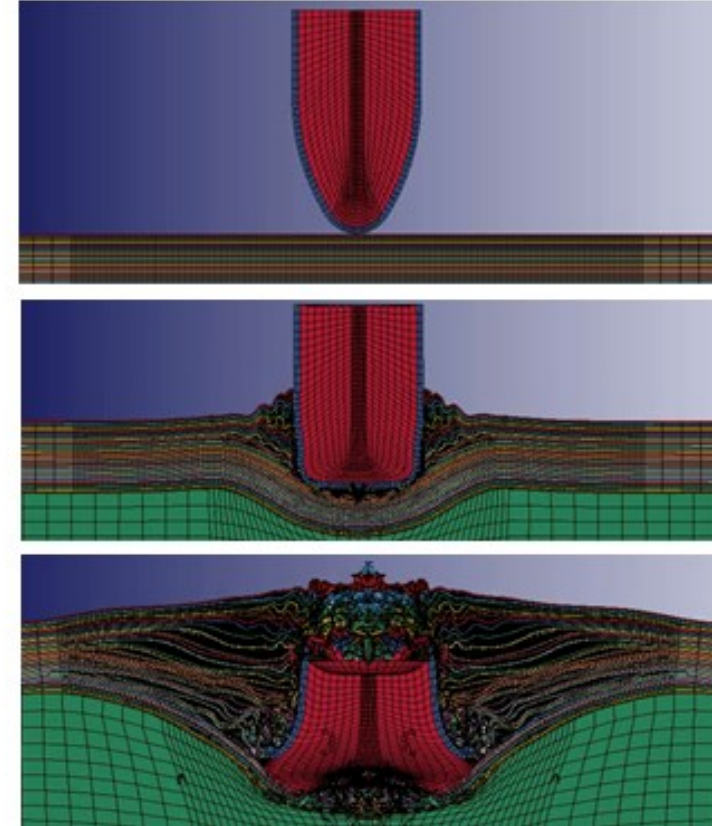
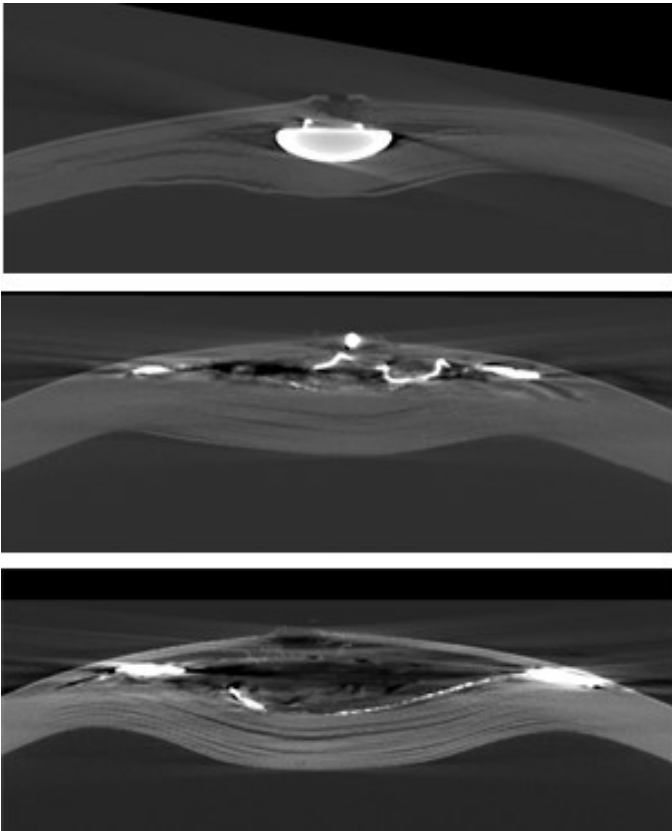
September 11-15, 2023 | Maritim Hotel and Conference Centre | Dresden | Germany

Programme

-

Terms and Conditions

as of August 31st, 2023



The Personal Armour Systems Symposium 2023 is organized by:



International Personal
Armour Committee



Bundeswehr Research Institute for
Materials, Fuels and Lubricants (WIWeB)



German Association for Defence Technology
Centre for Studies and Conferences

www.pass-2023.com

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About PASS 2023:

The International Personal Armour Committee (IPAC) is pleased to announce that PASS 2023 is hosted for the second time in Germany, at the Maritim International Hotel and Conference Centre in the City of Dresden, the capital of the federal state of Saxony. PASS 2023 will offer an outstanding opportunity for the exchange of views and experiences in the field of personal armour systems in an operational environment.

PASS is the only scientific symposium exclusively dedicated to the personal protection that brings together technical experts and scientists in that field.

It provides a unique opportunity:

- to interact with key players in this field of activities
- to discuss the scientific and technological challenges
- to discover the latest technical and commercial innovations

PASS 2023 will be the 16th in a series of symposia, which began at SCRDE in Colchester, UK.

PASS Symposia have been traditionally hosted by different countries every 2 years since 1990. The massive participation from North America has encouraged alternating the venue between the regions. The last Symposium in 2021 took place in Copenhagen, Denmark. The PASS Conferences attract attendees from countries around the world.

Experts will share the results of the latest research and discussions will allow inputs from participants. Attendees will include representatives from defence and academic research organizations, industry, military and police forces.

Symposium subjects include personal protection, military and police body armour, helmets, EOD protection and associated medical implications. In conjunction with the symposium, there will be an industry area to allow the discussion, illustration and promotion of ideas and equipment from our sponsors and exhibitors.



www.pass-2023.com



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The Symposium 2023

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The International Personal Armour Committee

	Hein Jager, M.Sc (Chairman) Ministry of Defence, Netherlands		CDR M.D. Peter Knudsen (Vice-Chair) University of Southern Denmark
	Lt. Colonel IMM Frederik Coghe, Dr Ir (Treasurer) Royal Military Academy, Belgium		Ana Ferreira Azevedo, PhD (Dep Treasurer) Royal Military Academy, Belgium
	Warren Tam (Secretary) Defence Science and Technology Laboratory, UK		
	Chris Ellis, Committee Member (CM) Defence Science and Technology Group, Australia		Simon Ouellet (CM) Def. Research and Development, Canada
	Franck Barbillon (CM) Ministère des Armées, France		Colonel M.D. Nicolas Prat, PhD (CM) Armed Forces Biomedical Res. Institute, France
	Heiner Gedon (CM) Bundeswehr WIWeb Institute, Germany		Lt. Colonel Dr. Steffen Grobert (CM) Bundeswehr Hospital Berlin, Germany
	Phil Gotts, Emeritus Member (EM) Phil Gotts Consulting Ltd, UK		Prof. Dr. Naresh Bhatnagar, FNAE (CM) Indian Institute of Technology Delhi, India
	Ir. Mat Philippens, MSc (EM) Netherlands		Bernt B. Johnsen PhD (CM) Norwegian Defence Research Establishment, Norway
	Ulf Arborelius, PhD (CM) Karolinska Institutet, Sweden		Philippe Drapela (CM) MoD Switzerland
	Janet Ward (EM) USA		Michael Maffeo (CM) Combat Capabilities Development Command, USA





Programme on Monday, September 11

12:00 Arrival of the Participants | Hotel Check-In

Time for lunch at the hotel or in the surrounding area (not included in the PASS Conference)

13:00 Conference Check In | Opening of the Exhibition | Welcome Coffee

15:00 **Welcome to PASS 2023**

Colonel (ret.) Bernd Kögel*

*Managing Director of SGW

Hein Jager*

*Chairman of the International Personal Armour Committee

Lt. Colonel Dr. Steffen Grobert*

*Bundeswehr Hospital Berlin, Chairman of PASS 2023

15:20 **Key Note DEU MoD**

Vice Admiral Carsten Stawitzki*

*Head of Unit Procurement, German Federal Ministry of Defence

15:50 **War in Ukraine: feedback on the lessons observed by the French Gendarmerie**

Dr. Guillaume Visseaux*

*French Gendarmerie Forensic Institute

16:20 **Operations Requirements for Personal Protection Branch**

Colonel (GS) Oliver Juncker*

*Branch Chief II 3.3., Bundeswehr Planning Office

16:50 Closing remarks Day 1

Lt. Colonel Dr. Steffen Grobert

17:00 Networking / Beercall in the Exhibition Area

17:30 Walking Dinner in the Exhibition Area

20:00 End of the first Day





Programme on Tuesday, September 12

08:00 Conference Counter Opens

08:15 Opening of the Exhibition
Welcome Coffee Served

Test Standards and Methods of Assessment (I)

Chaired by: Phil Gotts (IPAC) / Jon Russel (MoD UK)



09:00 **Ballistic Assessments of the ARL Reusable Temperature Insensitive Clay (ARTIC) as a Ballistic Backing Material**

Jared Gardner*, Jose Cora Cruz, Randy Mrozek, Jakob Hopping, Eric Beaudoin

*United States Army Aberdeen Test Center, United States of America



09:25 **Data Filtering for the Analysis of Biological Tests for Behind Armor Blunt Trauma Studies**

Alok Shah*, Justin McMahon, Joost Op 't Eynde, Rob Salzar, Blake Johnson, Joe McEntire

*Medical College of Wisconsin, United States of America



09:50 **Development of a physical human thorax surrogate dedicated to blunt ballistic impacts**

Martin Chaufer*, Rémi Delille, Franck Lauro, Olivier Mauzac, Sebastien Roth

*Interdisciplinary Laboratory Carnot of Bourgogne, France



10:15 **Increasing Confidence in the Performance of Ballistic-resistant Shields**

Brandon Bertsch*, Casandra Robinson, Jeffrey Horlick, Nicholas Roberts

*Oregon Ballistics Laboratory, United States of America


10:40 Coffee Break
Coffee and Snacks in the Exhibition Area





Programme on Tuesday, September 12

Behind Armour Blunt Trauma

Chaired by: Bernt Johnson (IPAC) / Karin Rafaels (USARL)

 11:20 **Scaling animal to human injury response for use in improved behind armor blunt trauma injury criteria**
*Joost Op 't Eynde**, Alok Shah, Justin McMahon, Brian Stemper, B Joseph McEntire, Dale Bass
*Duke University, United States of America

 11:45 **Behind Armour Effects for Overmatch Threats**
*Ana Azevedo**, Joachim Dhaenens, Angel Miranda-Vicario, Frederik Coghe
*Royal Military Academy of Belgium

 12:10 **Injury risk functions for behind armour blunt trauma based on clay backing cavity volume and depth**
*Gilles Pageau**, Simon Ouellet, Amal Bouamoul
*Defence Research and Development, Canada

12:35 Introduction to the social evening program

12:40 Lunch Break
Drinks and Lunch in the Exhibition Area

14:00 Introduction to the Poster Sessions / Speakers' Corners in the Plenum

14:30 **Parallel Poster Sessions / Speakers' Corners 1 – 12 (see next page)**

16:00 End of Program / get ready for the Guided Tour

16:30 Guided City Tour starting at the Hotel Main Entrance ending at the "Weiße Flotte".

18:30 **Ship Tour / Light Dinner**
Ship departs 19:00 on "Weiße Flotte" Port at Elbe River

22:00 **Ship returns**, Walk to the Hotel / End of the 2nd Day



Poster Presentations on Tuesday, September 12

Each poster will be presented four times (14:30-14:45 | 14:50-15:05 | 15:10-15:25 | 15:30-15:45), so that each visitor may go to his Top-4-Posters.
Posters will remain available for individual discussions until the end of the conference.



Poster 1:

An Alternative Method for Determining Penetration Limit Velocities Using Residual Velocity Data

Kenneth Hohnecker*, *Christopher Drake*

*U.S. Army Combat Capabilities Development Command, United States of America



Poster 2:

Beyond V_{50} : A More Comprehensive and Efficient Methodology for Assessing Armour Performance

Stéphane Magnan*, *Gilles Pageau*, *Amal Bouamoul*

*Biokinetics and Associates Ltd., Canada



Poster 3:

Comparison of dynamic and static backface deformation measures

Kathryn Loftis*, *David Barnes*

*US Army Futures Command, DEVCOM Analysis Center, United States of America



Poster 4:

Development of a new thoracic surrogate for KENLW and BABT impacts

Anca Andrei*, *Cyril Robbe*, *Thomas Penders*, *Alexandre Papy*

*Royal Military of Belgium



Poster 5:

Helmet Standoff Variation on Human Head

Erika Matheis*, *Karin Rafaels*

*Bennett Aerospace, United States of America



Poster 6:

Impact of mechanical stress on ballistic performance of body armor materials

Christian Boettger*, *Marcin Dombrowski*, *Marc Fietkau*, *Henk Knoester*, *Rob Woudman*, *Richie Delmont*

*Teijin Aramid, Germany



Poster Presentations on Tuesday, September 12



Poster 7:

Two ballistic test methods combined; residual energy method and digital image correlation (REM/DIC)

*F. M. Creusen**, E. P. Carton, E. van Zeijl, M. Vozarova, E. Neubauer

*TNO Laboratory for Ballistic Research, Netherlands



Poster 8:

Shock Tube Size Considerations for Headbourne Personal Protective Equipment: A Computational Sensitivity Study

*Alexander Iwaskiw**, Michael Baker, Rubbel Kumar, Vanessa Alphonse, Quang Luong, David Drewry

*The Johns Hopkins Applied Physics Laboratory, United States of America



Poster 9:

Testing light weight personal protection against sand particles

*A. Miranda-Vicario**, A. Azevedo, F. Coghe

*Royal Military Academy of Belgium, Department of Weapon Systems and Ballistics, Belgium



Poster 10:

The Fundamental Limitations of Clay for Assessing Human Response for Behind Armour Blunt Trauma

*Joost Op 't Eynde**, Derek Y. Pang, Robert S. Salzar, Timothy B. Bentley, Barry S. Shender, Cameron R. Bass

*Duke University, United States of America



Poster 11:

V₅₀ instead Vproof for highly protective EOD PPE when facing cost/panel limitations

*Jean-Philippe Dionne**, Clint Hedge, Aris Makris

*Med-Eng Holdings, Canada



Poster 12:

Injuries and operational implications caused by behind armour blunt trauma across various impact locations

*Caroline Howes**, Edward Mazuchowski, Andrew Rohrer, Matthew Clark, Nicholas Tsantinis, Quang Luong

*The Johns Hopkins University Applied Physics Laboratory, United States of America



Programme on Wednesday, September 13

08:00 Conference Counter Opens

08:15 Opening of the Exhibition
Welcome Coffee Served

Blast Injury and Mitigation (I)

Chaired by: Simon Ouellet (IPAC) / Matthias Sköld (Karolinska Institutet, Sweden)



09:00 Introductory Presentation

Development of Military Loading Exposure Guidelines for Prevention of Chronic Traumatic Encephalopathy

Mattias Sköld*,

*Karolinska Institutet, Sweden



09:25 **Test methodology for evaluating thoracic personal protective equipment against blast loading**

Johanna Boutillier*, Sébastien de Mezzo, Nicolas Prat, Pascal Magnan, Pierre Naz

*French German Research Institute of Saint Louis, France



09:50 **Computational Assessment of Headborne Equipment: Alteration of Head and Neck Biomechanics During Blast-Induced Accelerative Loading**

Melissa Yates*, Marshall Tumperi, Michael Lapera, Krithika Balakrishnan, Emily Crane, Griffin Holt

*The Johns Hopkins University Applied Physics Laboratory, United States of America



10:15 **Effects of torso and head protection from blast overpressure on intracranial biomechanics**

Nicolas Prat*, Aliénor Bardin, Michael Ogier, Sébastien De Mezzo, Vénétia Cardona, Pierre Naz, Johanna Boutillier, Pascal Magnan

*French Armed Forces Biomedical Research Institute

10:40 Coffee Break


Coffee and Snacks in the Exhibition Area



Programme on Wednesday, September 13

Behind Helmet Blunt Trauma

Chaired by: Steffen Grobert (IPAC) / Narayan Yoganandan (Medical College of Wisconsin, USA)

 11:20 **BHBT Impactor Classification using Machine Learning**
*Stéphane Magnan**, Ed Fournier, Nicholas Shewchenko, Simon Ouellet
*Biokinetics and Associates, Canada

 11:45 **Loads associated with behind helmet blunt trauma: Matched-pair load sensing head form tests correlated with skull fracture severity**
*Alexander Iwaskiw**, Caroline Howes, Rahul Hingorani, Connor Bradfield, Edward Mazuchowski, Matthew Clark
*The Johns Hopkins Applied Physics Laboratory, United States of America






12:35 Lunch Break
Drinks and Lunch in the Exhibition Area



Programme on Wednesday, September 13

Test Standards and Methods of Assessment (II)

Chaired by: Peter Knudsen (IPAC) / Eluned Lewis (UK)

-  14:00 **Edge Performance of Ballistic Helmets**
*Paul Fenne**, Phil Gotts,
*Phil Gotts Consulting, United Kingdom
-  14:25 **NIJ Standards for Ballistic Resistance of Body Armor and Stab Resistance of Body Armor: New Developments**
*Mark E. Greene**, Jeffrey Horlick, Daniel A. Longhurst, Lance L. Miller, Casandra Robinson, Richard A. Sundstrom
*National Institute of Justice, United States of America
-  14:50 **Raising the Standards for Protective Equipment used by Public Order Police Officers**
*Daniel Longhurst**, Casandra Robinson, Brian Montgomery, Jeffrey Horlick, Ryan Schauf, Robert Kinsler
*RTI International, United States of America
-  15:15 **The effect of backing methods on the measured ballistic performance of armour materials**
*James Keirl**, Gregory James*,
*Defence Science and Technology Laboratory, United kingdom
-  15:40 **V₅₀ determination challenges for state of the art body armour**
*M.J. van der Jagt-Deutekom**, J.P.F. Broos
*TNO, Netherlands
- 16:05 End of Program / Leisure time



Programme on Thursday, September 14

08:00 Conference Counter Opens

08:15 Opening of the Exhibition
Welcome Coffee Served

Threats (including Laser)

Chaired by: Hein Jager (IPAC) / Jane Barnes-Warden (London Metropolitan Police Service, UK) requested

 09:00 **An experimental investigation into the threat posed by arrows to body armor**

*Marina Seidl**, Kevin Lehmann, Steffen Grobert

*French-German Research Institute of Saint-Louis, France

 09:25 **Development of a new Type of Laser Safety Goggles for Aviation Crews: Results of Combining Absorptive and Reflective Filters**

*Marcel Kalter**, Frank M. Jakobs, Peter Hank, Dietrich Pertsch, Ralf Mönikes

*ESG Elektroniksystem- und Logistik-GmbH, Germany

 09:50 **Police versus Military Ammunition: Design, Wound Ballistics and Standards**

*Phil Gotts**

*Phil Gotts Consulting, United Kingdom

 10:15 **Rifle Burst Fire Testing - Probability of Number of Impacts on Hard Armour Panel**

*Naresh Bhatnagar**, Hemant Chouhan, Kartikeya Kartikeya, Khushi Ram, Aisha Ahmed, Makhan Singh

*Indian Institute of Technology, India

10:40 Coffee Break

Coffee and Snacks in the Exhibition Area



Programme on Thursday, September 14

Casualty Reduction / Human Factors

Chaired by: Ulf Arborelius (IPAC) / Paul Fenne (UK)



11:20 Body Armour Comfort & Mobility Assessment

*Christophe Djololian**, *Louis Boogh*

*DuPont Specialty Products Operations, Switzerland



11:45 Bladed Weapon Assaults and Human Vulnerability

*Jane Barnes-Warden**, *Peter F Mahoney*

*London Metropolitan Police Service, United Kingdom



12:10 Impact assessment of load bearing vests, combat armor and ventilated vest configurations on thermal strain

*Boris R.M. Kingma**

*TNO, Netherlands

12:35 Lunch Break


Drinks and Lunch in the Exhibition Area





Programme on Thursday, September 14

Personal Armour and Items

Chaired by: Naresh Bhatnagar (IPAC) / Michael Maffeo (US Army)

 14:00 **V50 Study of Light-Weight Body Armour Inserts under Angle Shot**
*Karl Bernhard Bolz**, Sven-Ulrich Hensellek, Malte Veehmayer
*Rheinmetall Protection Systems, Germany

 14:25 **Development and performance of an UHMWPE Rifle Helmet**
*Mirre van der Kamp**, Ulrich Heisserer, Jos van Elburg, Dirk Louwers
*Avient protective Materials, Netherlands

 14:50 **Extended Life Analysis (ELA) of Ceramic Plates**
*Phil Gotts**
*Phil Gotts Consulting, United Kingdom

15:15 Coffee Break

 16:00 **Generative Design of soft-armour**
*Yoeng Sin Khoe**
*TNO, Netherlands

16:25 **Introduction to PASS 2025**
Chairman of PASS 2025
Group-Photo of PASS 2023 attendees

16:50 Networking in the Exhibition Area

18:00 Exhibition closes / dress up for Gala Dinner

19:00 Gala Dinner - Dinner Speech: Colonel (ret.) Bernd Kögel

23:00 End of Dinner





Programme on Friday, September 15

08:00 Conference Counter Opens

08:15 Opening of the Exhibition
Welcome Coffee Served

Armour Materials

Chaired by: Frederik Coghe (IPAC) / Phil Gotts (IPAC)



09:00 **Effect of Backing Material Stiffness on Ballistic Performance of Ceramic/UHMWPE Personal Body Armor**

Naresh Bhatnagar*, Kartikeya Kartikeya, Hemant Chouhan, Dhruv Narayan, Aisha Ahmed, Khushi Ram

*Indian Institute of Technology, India



09:25 **Development and Simulation of Protective Systems for Energy Absorption under Ballistic Loading Conditions**

Lennart Alkemade*, Jan Bohlen

*TSS International, Netherlands



09:50 **Towards a Fully Circular Aramid Yarn**

Bert Gebben*,

*Teijin Aramid, Netherlands



10:15 **What is the effect of composite covers on ceramics in hard armour plates?**

Bernt B. Johnsen*, Dennis B. Rahbek

*Norwegian Defence Research Establishment (FFI), Norway

10:40 Coffee Break




Coffee and Snacks in the Exhibition Area



Programme on Friday, September 15

Blast Injury and Mitigation (II)

Chaired by: Nicolas Prat (IPAC) / Michael Maffeo (US Army)

-  11:20 **Hybrid III and THUMS Headforms Comparison for EOD Helmet Blast Mitigation Performance**
*Jean-Philippe Dionne**, Ming Cheng, Jeffrey Levine, Aris Makris
*Med-Eng Holdings, Canada
-  11:45 **Influence of torso protective equipment on intracorporeal shock wave behavior**
*Henrik Seeber**, Steffen Grobert, Daniel Krentel, T. Hauer
*Helmut-Schmidt-University / Hamburg University of the German Federal Armed Forces, Germany
-  12:10 **Blast load on operating personnel from shock grenade**
*Audun Bjerke**
*Norwegian Defence Research Establishment, Norway
- 12:35 **See you 2025**
*Hein Jager**
*Chairman of the International Personal Armour Committee
*Lt. Colonel Dr. Steffen Grobert**
*Bundeswehr Hospital Berlin, Chairman of PASS 2023
- 12:50 Lunch
Drinks and Lunchbox in the Exhibition Area
- 14:00 End of PASS 2023



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■ Pricing for Conference Visitors

The conference is open for members of the armed forces, research institutes, the civil services, parliaments and ministries, embassies, science and business.

For companion attendance, please send a request to: events@dwt-sgw.de

Conference fee day 1-5 1.395,00 Euro

Conference fee one day 499,00 Euro

[Sign up as a Visitor here](#)

■ Accommodation

The conference hotel :

<https://www.maritim.com/en/hotels/germany/hotel-internationales-congress-center-dresden/hotel-overview>

Hotels in walking distance:

B&B Dresden: <https://www.hotel-bb.com/de/hotel/dresden>

Holiday Inn Dresden: <https://www.ihg.com/holidayinn/hotels/gb/en/dresden/drshi/hoteldetail?>

Leonardo Hotel Dresden Altstadt: <https://www.leonardo-hotels.de/dresden/leonardo-hotel-dresden-altstadt>

Penck Hotel Dresden: <https://www.penckhoteldresden.de/en/>

■ Your contacts

Programme / Call for Abstracts / Contents

Lt. Colonel Dr. Steffen Grobert

SteffenGrobert@bundeswehr.org

Bundeswehr Hospital Berlin

Registration for Visitors & Exhibitors / Organisation

Organisation Office

events@dwt-sgw.de

German Association for

Defence Technology

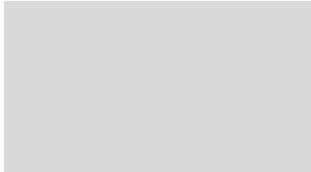


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■ Pricing for Sponsors / Exhibitors



Option A | „Exhibition Space“ | 290,00 € per square meter

Option A includes: stand in the size and position of your choice, 1 ticket per 6 m² booked space, 20% discount for additional “full tickets”, 50% discount for “exhibition only Tickets”, security charge.



Option B | „System Booth“ | 380,00 € per square meter

Option B includes: Option A, Octanorm system stand, carpet expo rips grey, booth cleaning at night, electricity (up to two 3-socket connectors).



Option C | „System Booth All Inclusive“ | 460,00 € per square meter

Option C includes: Option B, illumination of the booth, front-banner with your logo 200 x 50 cm, furniture, lockable storage area (if needed), carpet in the colour of your choice.



Option D | „Individual Booth“ | 560,00 € per square meter

Option D includes: Option C, premium-booth building, i.e.: wood-construction or printed stretchframe-system, presentation technology (TV, beamer), graphics at the booth, laminate / parquet / carpet.

Sponsoring

At PASS 2023 we offer one Gold, one Silver and one Bronze Sponsoring option.

Please contact us for details: stephan.bruess@dwt-sgw.de

Visitor and exhibitor registration => www.pass-2023.com <=



■ Notes on Participation

With your registration you agree to the electronic processing and storage of your personal data. Photos and/or film recordings might be taken during the event and published without further notice. You consent to the distribution of a list of participants (name/function/institution) to the forum participants. With your registration / signature, you accept the conditions of participation in this invitation, the general terms and conditions and the data protection agreement of SGW Ltd, which can be viewed (in German / English) at www.dwt-sgw.de.

All prices quoted do not include VAT (except hotel rate).

Confirmed Authors / Speakers will have to submit a signed copyright licence that has to be sent in by the main author / entity that is in the possession of the copyrights before the final acceptance of the paper by the review committee. The main author shall ensure he is in possession of permission to publish from all co-authors. The presentations will be released immediately at the end of the conference for the attendees and will be released to the public six months later.

Liability

If an event is canceled for unforeseeable reasons, the registered participants and exhibitors will be informed immediately and any participation and exhibition fees already paid will be refunded. The liability of the SGW is limited to the participation and exhibition fee.

Cancellation conditions

Our cancellation periods: cancellations are free of charge for participants up to 5 days before the conference. Exhibitors have the option of free cancellation up to five weeks before the event.

Organisation:

Centre for Studies and Conferences of the German Association for Defence Technology Ltd. (SGW)

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