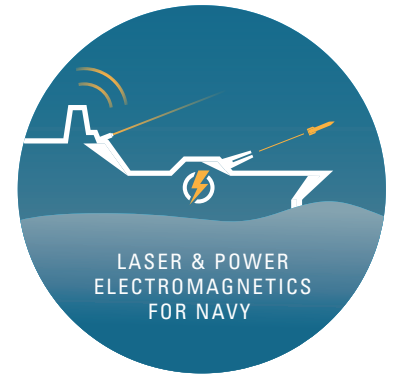


Workshop on

# LASER & POWER ELECTROMAGNETICS FOR NAVY

20-21 November 2024

ISL – French-German Research Institute of Saint-Louis, Saint-Louis, FR



The technologies of Directed Energy Weapons (DEW), electromagnetic launchers and pulsed power systems have advanced to a point where they can be considered for future applications in military operations, especially within naval contexts. Indeed, first demonstrations of High Energy Laser (HEL) on naval vessels have recently boomed, increasing the interest in high-power fibre lasers. High-Power Microwave (HPM) systems are also emerging as a promising technology for neutralising UAVs, particularly in saturation attack scenarios. Systems based on electromagnetic acceleration, such as railguns and electromagnetic catapults, have significantly advanced in their technological readiness. Currently, railguns can launch projectiles to very high speed ( $> 2$  km/s), reaching ranges in excess of 200 km. These technologies require high-power and/or high-energy electrical generators. Recent advancements in electrical energy storage and power multiplication make it now possible to consider these technologies for being implemented on a surface warship. Electric weapon systems, including laser, HPM and railguns, could provide naval forces with a significant operational advantage in maritime combat scenarios since these systems are particularly effective against missiles, aircraft and drones. Special attention is given to asymmetric threats, where cost-effective countermeasures are crucial as well as to new conventional threats that demand rapid self-protection. Additionally, the implementation of electric weapons may impact ship architecture, hazards, standards, equipment compatibility and stealth, all of which need careful evaluation.

**In this context, the French-German Research Institute of Saint-Louis (ISL) is organising a workshop on “Laser & Power Electromagnetics for Navy”.**

The workshop will have plenary presentations in which the participants can share their views and results of their work in dedicated talks with time for questions and discussions. This workshop will be held in-person on-site in order to provide an opportunity for exchange and networking between representatives from industry, academia, government agencies and the navy. It will be possible to visit the ISL laboratories. The workshop is open to French and German citizens only.



Workshop on

# LASER & POWER ELECTROMAGNETICS FOR NAVY

20-21 November 2024

ISL – French-German Research Institute of Saint-Louis, Saint-Louis, FR



## Accommodation

Please book your room directly with the hotel. Some hotels have special rates for ISL visitors.

## Location

French-German Research Institute of Saint-Louis – ISL  
5 rue du Général Cassagnou – BP 70034  
68301 SAINT-LOUIS Cedex – France

## Conference registration

Before 20<sup>th</sup> October, 2024

## Dinner registration

35 € at a local restaurant on 20<sup>th</sup> November

## Lunches

12 €/day (paid on arrival at the workshop)

## Entry requirements

Please note that access can only be granted upon presentation of an identity card or passport. All visitors acknowledge that they will be subject to prior administrative security check (according to French Law, Article L. 114-1 Internal Security Code).

## Contact

Organisational Committee – +33 (0)3 89 69 53 73 – E-mail: [LPEMnavy@isl.eu](mailto:LPEMnavy@isl.eu)

ISL Communication Department – +33 (0)3 89 69 51 33 – E-mail: [communication@isl.eu](mailto:communication@isl.eu)



A joint initiative of:



Bundesministerium  
der Verteidigung

Workshop on

# LASER & POWER ELECTROMAGNETICS FOR NAVY

20-21 November 2024

ISL – French-German Research Institute of Saint-Louis, Saint-Louis, FR



## PROGRAMME

Wednesday, November 20<sup>th</sup>, 2024

From 12:30 Registration & Lunch

**13:30 Welcome address and technical announcements**

- ◆ *Directors and division head, ISL*

### National Requests & New Threats For Navy

- 14:00 Deutsche Marine keynote  
◆ *Tbd, German Navy*
- 14:20 Marine Nationale keynote  
◆ *Cdr A. Debieuvre, LtCdr M. Duvoux, Capability Development Department, French Navy*
- 14:40 A potential approach to evaluating the performance of Direct Energy Weapons (DEW) using tactical-operational use cases  
◆ *F. Boller, Marinetechnik GmbH*
- 15:00 Hypersonic threats  
◆ *F. Leopold, S. Bagy, ISL-AMS*

**15:20 Coffee break & Group photo**

### Laser Directed Energy Weapon

- 15:50 High-power 2  $\mu\text{m}$  fiber lasers and MWIR sources to counter infrared-guided missiles and UAVs  
◆ *A. Hildenbrand-Dhollande, C. Louot, N. Dalloz, F. Sanson, T. Ibach, M. Piotrowski, A. Berrou, C. Müller, S. Schmitt, S. Bigotta, ISL-DPA*
- 16:10 Requirements of Laser Weapon Systems on the Power Supply and Cooling System on the mobile Carrier Platform  
◆ *M. Jung, Th. Baumgärtel, U. Stuhr, J. Schmitz, Rheinmetall*
- 16:30 Laser Directed Energy Weapon activities and developments at CILAS  
◆ *D. Sabourdy et al., CILAS*
- 16:50 High-precision Tracking for Laser Weapons  
◆ *M. Klaumünzer, J. Kalinski, MBDA Deutschland GmbH*
- 17:10 Overview of High Energy Laser terminal effects  
◆ *V. Allheily, R. Schmitt, J. Kokot, L.-X. Lefranc, M. Couchoux, T. Goepfert, F. Lacroix, L. Merlat, ISL-RIM*
- 17:30 CHRISTIE: flying bench for tactical laser weapon performance evaluation  
◆ *G. Balle, E. Bartinicki, O. Meyer, DGA-MI*
- 17:50 Protection of Optronics Systems against Laser Threats by Passive Optical Limiting  
◆ *O. Muller, M. Guerchoux, C. Bruder, L. Merlat, ISL-RIM*

**19:30 Symposium dinner**

Workshop on

# LASER & POWER ELECTROMAGNETICS FOR NAVY

20-21 November 2024

ISL – French-German Research Institute of Saint-Louis, Saint-Louis, FR



Thursday, November 21<sup>st</sup>, 2024

## Radiofrequency Directed Energy Weapon

- 08:30 RF DEW Demonstrator: Adaptation for anti-UAV Warfare  
◆ *N. Albuisson, CEA-Gramat*
- 08:50 Diehl DEW HPRF Effectors and Technologies to Counter UAV  
◆ *R. Stark, Diehl Defence*
- 09:10 Protection against autonomous sUAS and swarms – field of application for High Power Electromagnetics (HPEM)  
◆ *M. Lanzrath, M. Schwarz, Fraunhofer Institute for Technological Trendanalysis*
- 09:30 Building Blocks for a Compact Narrow-Band Electromagnetic Directed Energy Weapon  
◆ *A. Catrain, A. Chauloux, J.C. Diot, A. Loyer, Y. Delvert, CEA-Gramat*
- 09:50 A forensic HPM detection system for detecting electromagnetic interference attempts  
◆ *C. Adami, T. Pusch, S. Ruge, M. Suhrke, Fraunhofer Technological Trendanalysis*

10:10 **Coffee break**

## Electromagnetic Launchers

- 10:40 Maturation of Railgun Technology: An Overview of the European THEMA Project  
◆ *P. Wey, M. Schneider, B. Reck, V. Andraud, P. Delmote, F. Bieth, O. Liebfried, V. Brommer, M. Berard, B. Martinez, M. Albisser, ISL*
- 11:00 Railgun potential for Baltic sea scenarios  
◆ *M. Schneider, ISL-ERG, A. Manz, M. Spindler, IABG*
- 11:20 Electromagnetic compatibility related to the integration of railgun on a war ship  
◆ *P. Delmote, F. Bieth, ISL-ERG*

## Pulsed Power, Electrical Storage & Power Distribution

- 11:40 Demand and Challenges for the Integration of Energy Weapons into Warships  
◆ *P. Hauschildt, Thyssenkrupp Marine Systems*
- 12:00 Electrical architecture of French Navy Ships  
◆ *J. Gillet, S. Candela, DGA-TN*
- 12:20 Pulsed Power Supply for Railgun  
◆ *O. Liebfried, V. Brommer, M. Berard, F. Albrecht, F. Haag, ISL-EHI*
- 12:40 Conclusion

13:00 **Lunch**

14:00 **Visit of the ISL Laboratories**

16:00 **End of the day**