

**Member Institution Data**

Logo or Photo of Institute in jpg format



# Fraunhofer

## EMI

Name of Institute	Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut EMI
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**Outline**

The Fraunhofer Institute for High-Speed Dynamics, Ernst Mach Institute (EMI) conducts research into physical high-speed processes through experiments and simulations, such as crashes, explosions, or collisions. Based on this research, the institute develops safety and resilience concepts. The institute's research areas include building protection, safety in urban systems, resilience of infrastructure networks, safe mobility, aircraft safety, satellite development, and research for the German Armed Forces. Of specific relevance for the objectives of GADRI is the Department for Risk Management and Protective Structures at Fraunhofer EMI with a long track record of applied research on risk mitigation and hazard assessment related to high-speed dynamic physical phenomena.

**Research Achievements and Challenges:**

Long track record of successful research projects conducted around civil protection, disaster control, and risk identification and prevention such as the EU-projects VITRUV, BESECURE, and INACHUS and many other. Inhouse development of many proper simulation tools, i.a. CaESAR (Cascading Effect Simulation in Areas for increasing Resilience), and VITRUV (Vulnerability Identification Tools for Resilience Enhancements of Urban Environments).

Unique experimental facilities of EMI include i.a.:

- Acceleration facilities for masses between a few grams and up to some hundred kilograms to velocities of up to 40,000 kilometers per hour
- Test benches for materials of all kinds, which enable the measurement of

mechanical characteristics under loading of very high strain rates in a very broad spectrum

- Sensor systems for the measurement of physical parameters in rough and blast/shock-wave loaded environments
- Particular test facilities for the analysis of vehicles and components with new propulsion technologies under crash loading.

**Suggestions for GADRI Future Directions:**

- Investigate on the climate and security nexus, i.e., the impact of climate change and related environmental degradation on peace and security.
- Enhancing understanding of man-made disasters and their effects on livelihoods and environment.
- Taking a holistic approach on cascading effects among various types of disasters and their impact on human livelihoods.