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# RESEARCH AND DEVELOPMENT AT FRAUNHOFER ERNST-MACH-INSTITUT (EMI)

Preparation for the 5th Call of the 7th EU Framework Program

University of Latvia, Riga, July 19<sup>th</sup>, 2011

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# Fraunhofer Ernst-Mach-Institut (EMI)

## An institute for applied physics and engineering

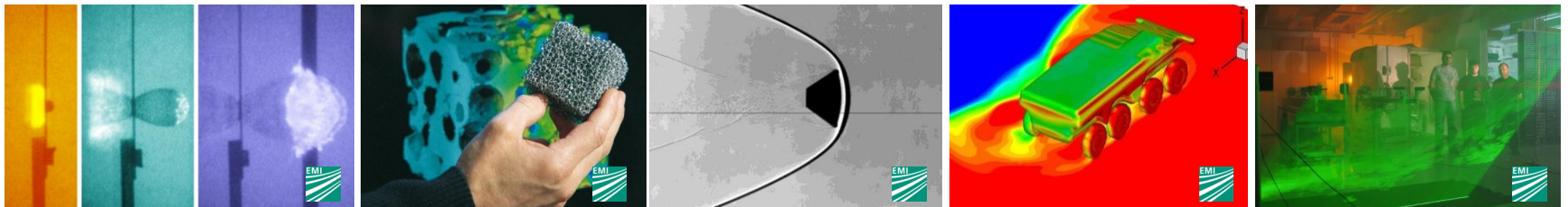
### Fraunhofer EMI

- 300 Employees
- Budget 20 M€
- 3 Locations

### Topics

- Shock wave and impact physics
- Material sciences
- Computational Physics
- Safety technologies
- High-speed measurement techniques

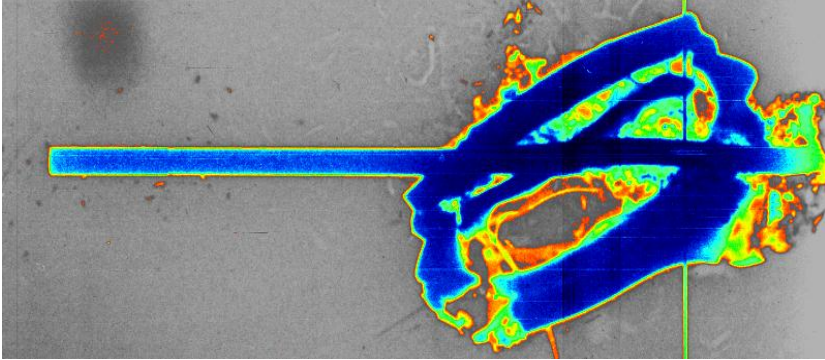
### Institutes in the Fraunhofer Society



# Facts on Fraunhofer EMI

## Business segments

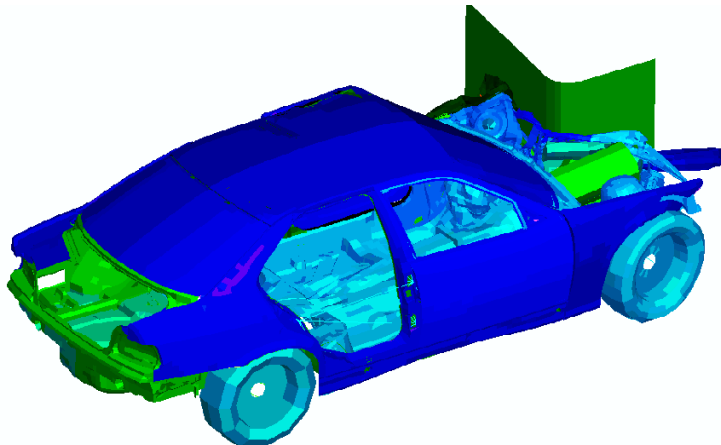
Defence



Security



Automotive



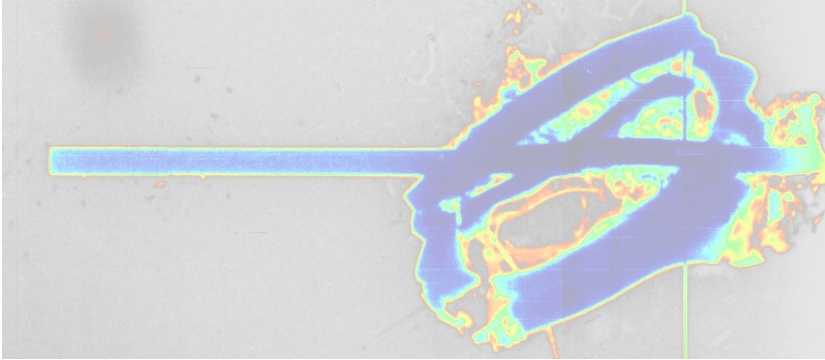
Space



# Facts on Fraunhofer EMI

## Business segments

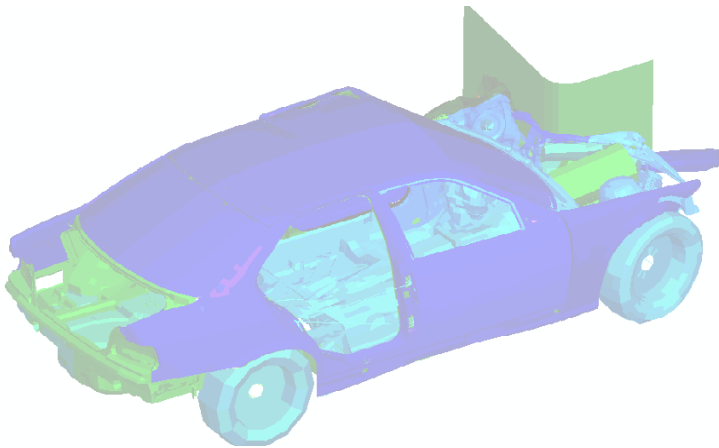
Defence



Security



Automotive



Space



# Fraunhofer EMI experience in FP-7

- Currently collaborating in
  - 2 projects from 3<sup>rd</sup> call
  - 1 project from 4<sup>th</sup> call
  
- Ideas for 5<sup>th</sup> call (not exhaustive):
  - 3 ideas for **“Key technologies for in-space activities”**  
SPA.2012.2.2-02
  - 1 idea for **“R&D for in-situ component”**  
SPA.2012.1.3-01
  
- EMI would participate as a team member



# Key technologies for in-space activities

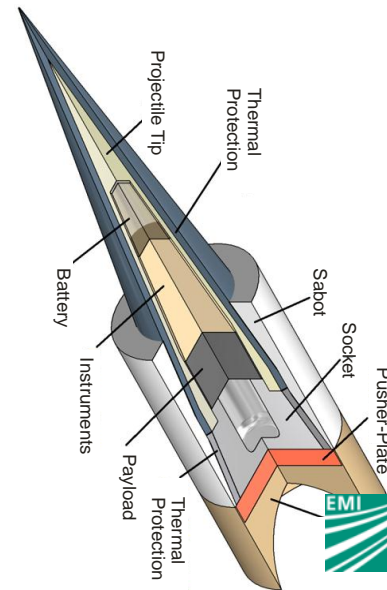
## Next generation habitats: Inflatable modules

- Inflatable modules allow future space exploration with large volume modules
- Research interest:
  - Materials
  - Packaging
  - Deployment
  - Protection (debris, radiation)
- EMI heritage:
  - debris protection
  - material modelling
  - sensor integration

# Key technologies for in-space activities

## New concepts for launch of small sub-orbital payloads

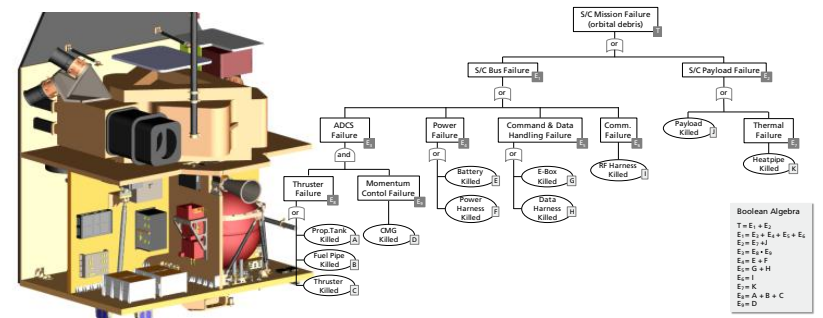
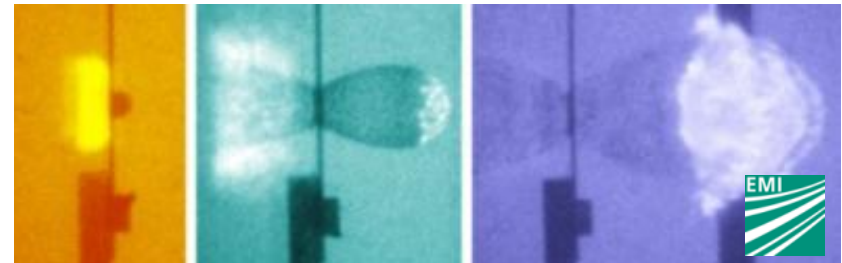
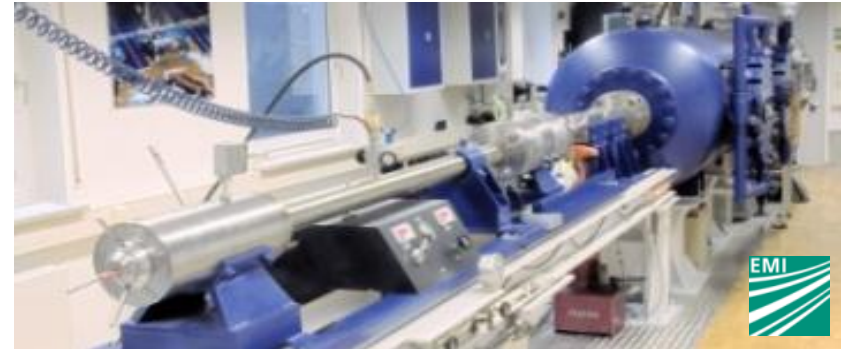
- Light gas guns provide high altitude capability for small payloads
  - Inflatable spheres and mylar chaff clouds for meteorological missions
  - Compact sensors for geophysical or astrophysical sciences
  - Hypersonic flight & re-entry experiments
- Technology under development at EMI



# Key technologies for in-space activities

## Understanding satellite vulnerability against impacts

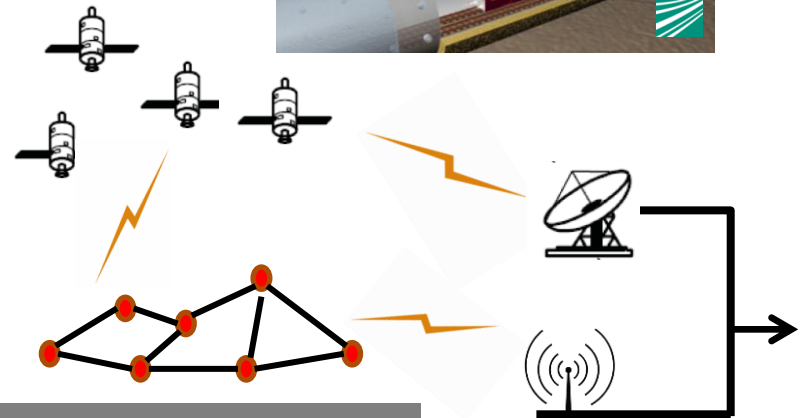
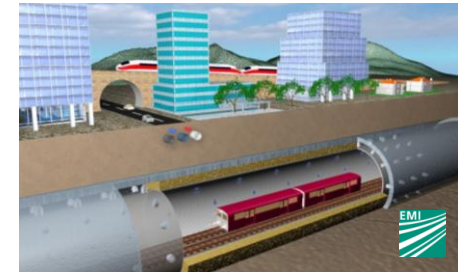
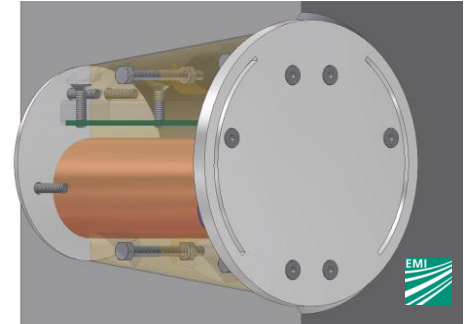
- Reducing vulnerability
  - Hypervelocity impact testing
  - Modeling component and system vulnerability
  - Protection concepts
  - Shielding technologies
  - Integrated sensor systems



# Research and development for in-situ component

## Combination of ground- and satellite-based data

- Sensor platform development at EMI (Fed. Ministry of Economics and Technology)
  - Energy-autarkic
  - Wireless
  - Distributed
  - I/F with satellite or mobile network
- Applications
  - Security applications
  - Disaster monitoring
  - Environmental monitoring
  - Satellite health monitoring



Distributed sensor network

# Contact

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