

FORENSICS
FORensic ENgineering ServICeS

*Technology transfer for simulation and prevention of losses
due to natural and man-made events*

FORENSICS srl – Spin off company of the University of Naples Federico II

Mission

To provide advanced engineering services using innovative and integrated methodologies and tools for prediction and back-analysis of damage to people, constructed facilities (buildings, infrastructures, etc.) and natural environment due to natural, man-made and NaTech events.

Tsunamis



Landslides



Explosions



Earthquakes



Hurricanes



Floods



Fires

Team



Elia Acconcia
Civil Engineering &
Software Development



Nicola Augenti
Structural Failures &
Forensic Engineering



Andrea D'Anna
Fire, Explosion &
Pollution



Francesco Murena (CEO)
Business Development



Fulvio Parisi
Structural & Risk
Engineering



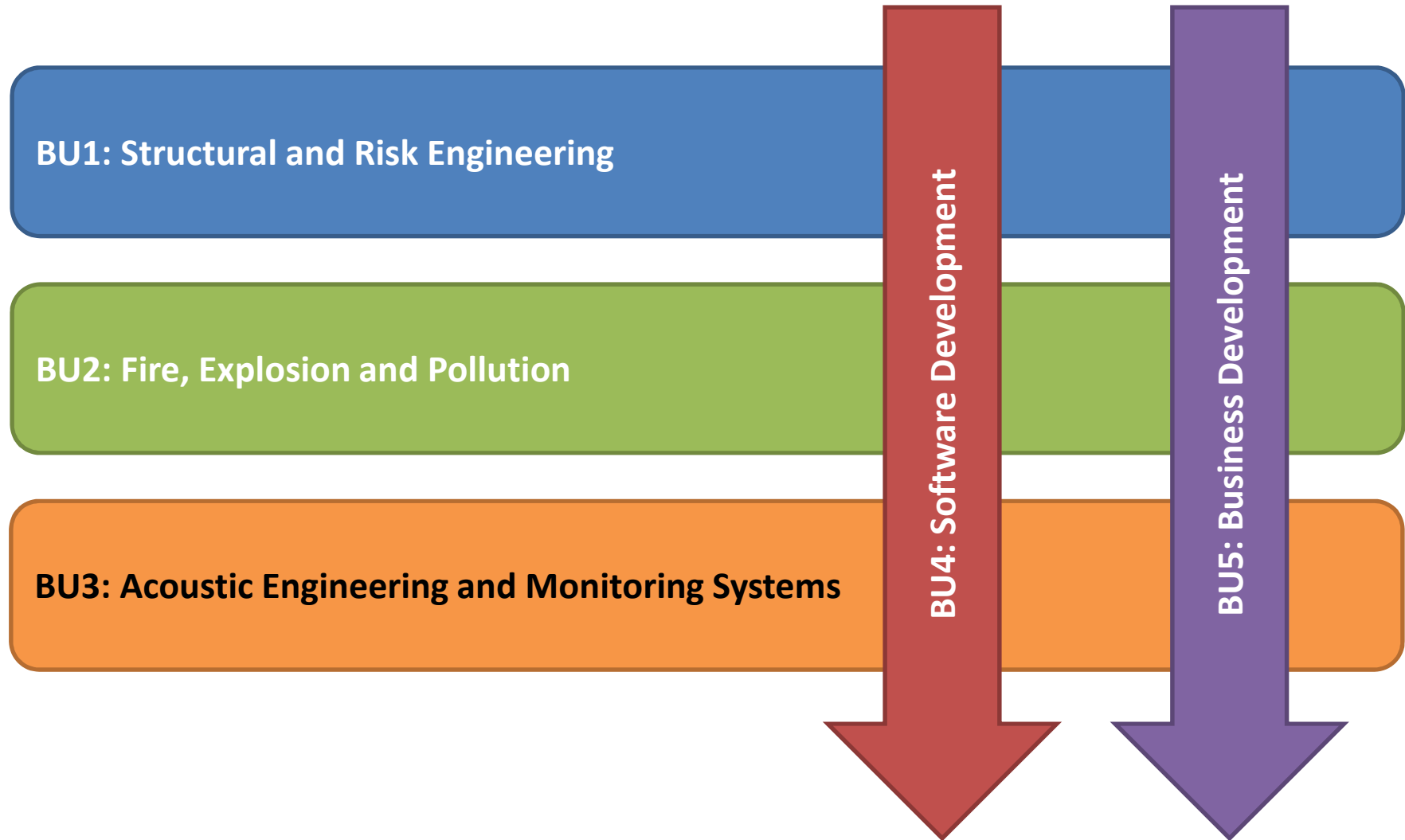
Martina Scalvenzi
Structural & Geotechnical
Engineering



Rosario Romano
Acoustic Engineering &
Monitoring Systems



Assunta Cammardella
Management Engineering



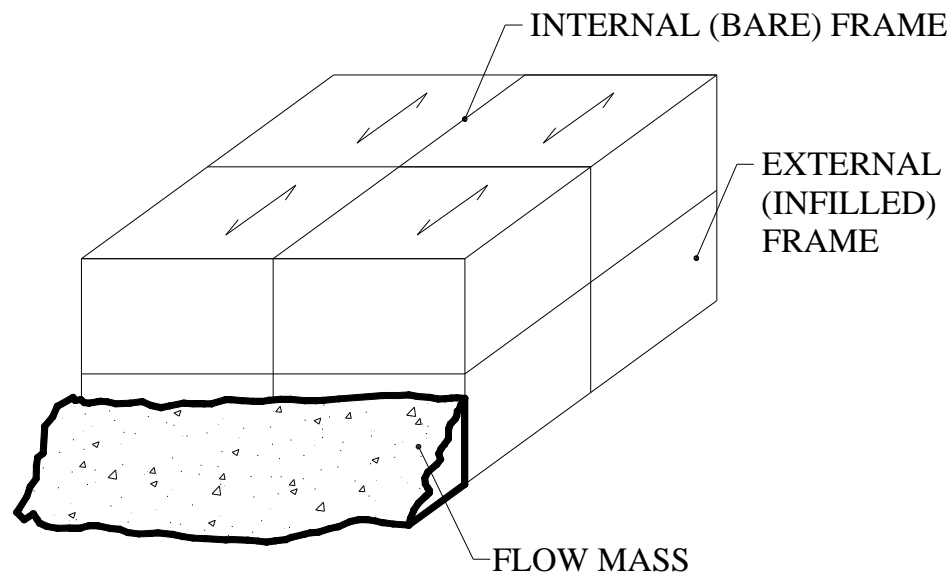
- ❑ **Advanced numerical simulations (either single- or multi-physics) for prediction and reverse analysis of damage to people, physical property and natural environment**
- ❑ **Safety assessment and risk mitigation measures for identified and non-identifiable hazards**
- ❑ **Structural health monitoring for safety assessment and risk mitigation of buildings and infrastructures**
- ❑ **Environmental monitoring (either site-specific or spatially distributed) for assessment of noise and pollution (water, soil, air)**
- ❑ **Software development for multiple electronic devices (computers, mobile phones, tablets, etc.)**

- ❑ **Continuous process and product innovation integrated with digital technologies and data-driven techniques (artificial intelligence, virtual/augmented/mixed reality, cloud computing, internet of things, robotics, etc.)**
- ❑ **Multidisciplinary problem solving thinking for complex engineering issues to support decision makers and stakeholders**
- ❑ **Strong connection with industry and facility managers to solve real-world problems and to foster practice-oriented research studies (e.g. response to regional, national and international calls for projects)**
- ❑ **Direct involvement smart young people such as top PhD students, graduate/post-graduate trainees (including top students of MSc programme in Forensic Engineering at University of Naples Federico II), research fellows and young professional engineers**

Prediction and simulation of the impact of natural and man-made events on structures and infrastructures

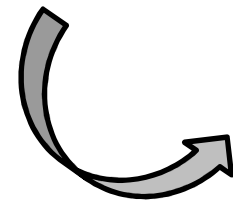
Earthquakes, landslides and windstorms

Mudflow modelling and impact assessment (e.g. Sarno, Italy, 1998)

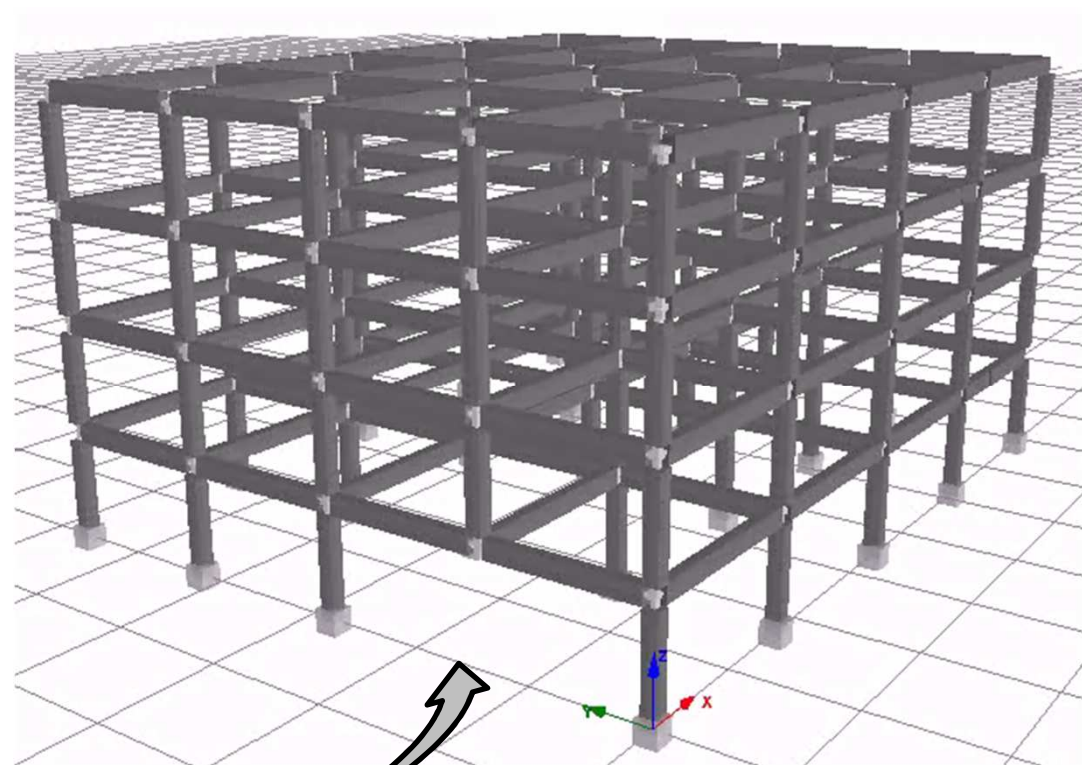
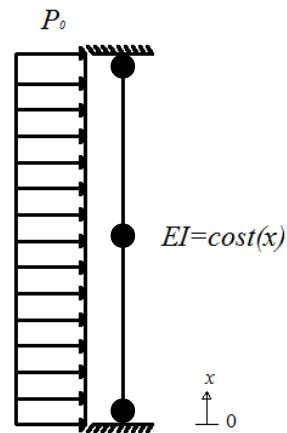


Prediction and simulation of the impact of natural and man-made events on structures and infrastructures

Fire, explosion and impact



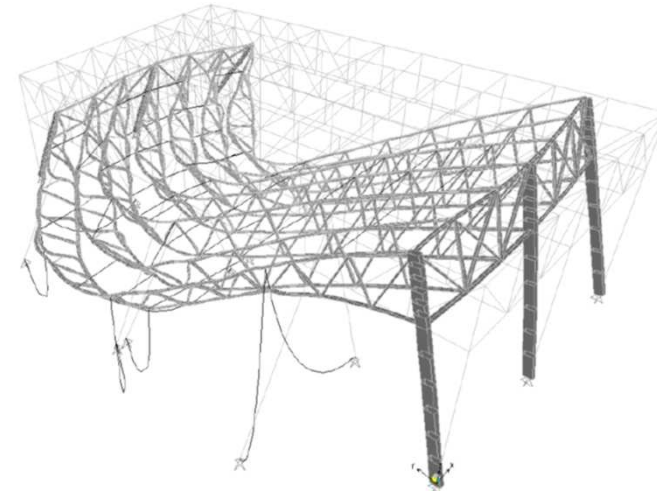
Damage to single elements



Partial or total collapse of residual structure

Prediction and simulation of the impact of natural and man-made events on structures and infrastructures

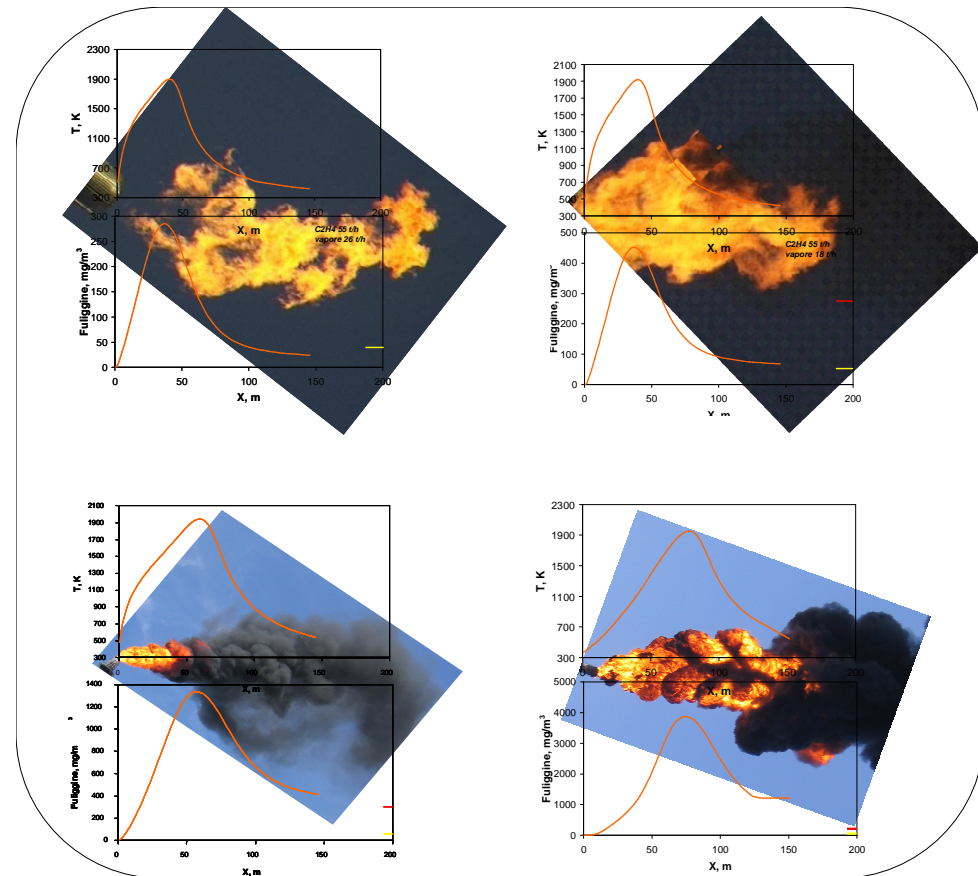
Human error in design, construction and maintenance



Evaluation of the emission of odorous substances and toxic combustion by-products from industrial flares

Flaring is modelled by CFD using detailed kinetics for oxidation, pyrolysis and formation of toxic combustion by-products:

- 3D flow patterns of velocities, temperatures and species
- Radiative and convective heat fluxes
- Long- and short-range pollutant dispersion and transformation in the atmosphere
- Secondary pollutant formation

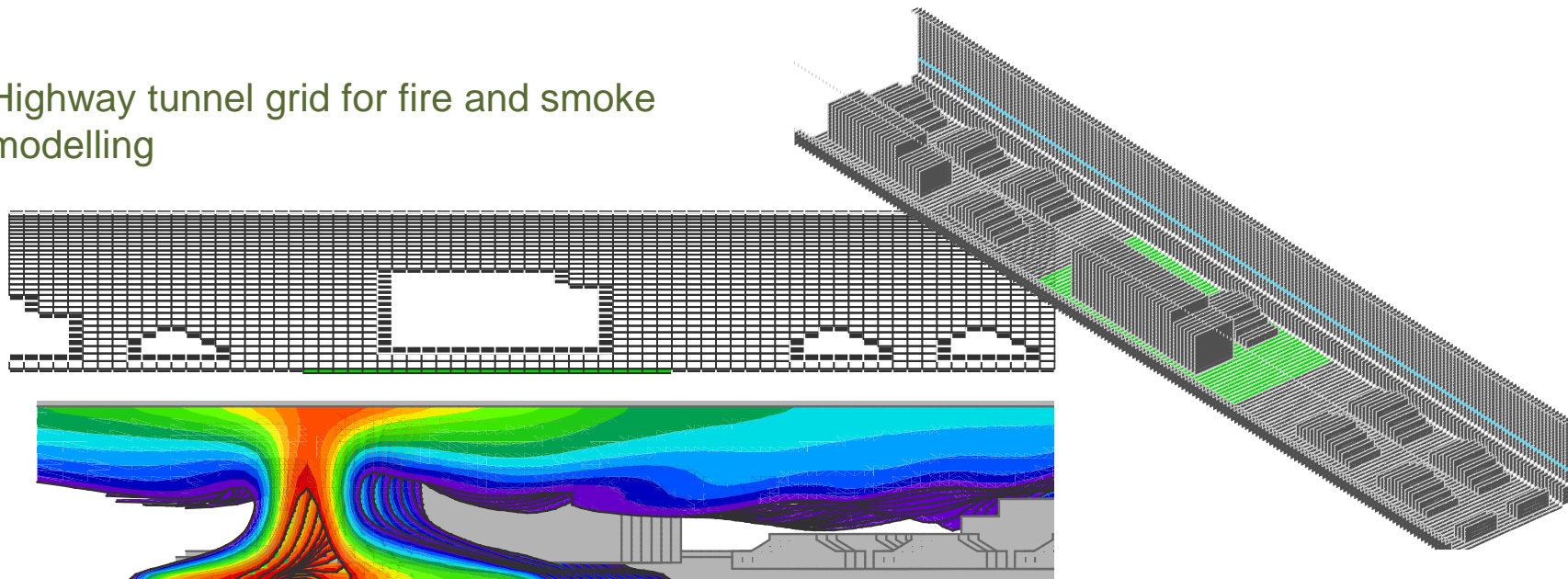


Fire and smoke simulations

Computational Fluid Dynamics to predict:

- 3D flow patterns and velocities
- Temperature distributions
- Smoke layer and toxic-species concentrations
- Radiative and convective heat fluxes
- Active fire protection methods (sprinklers, fast water supply systems)
- Time-dependent or steady-state solutions

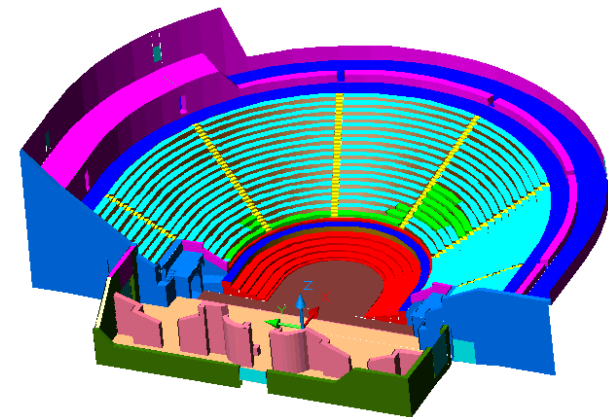
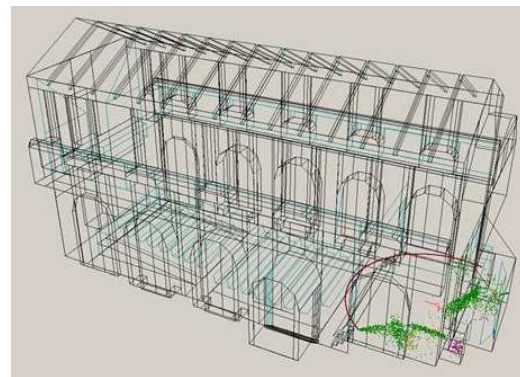
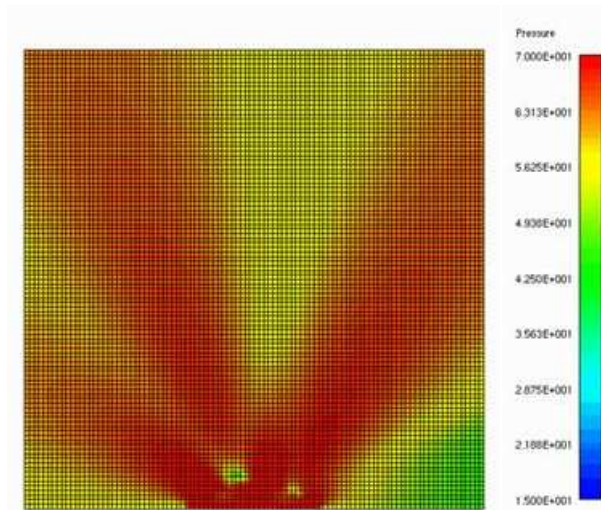
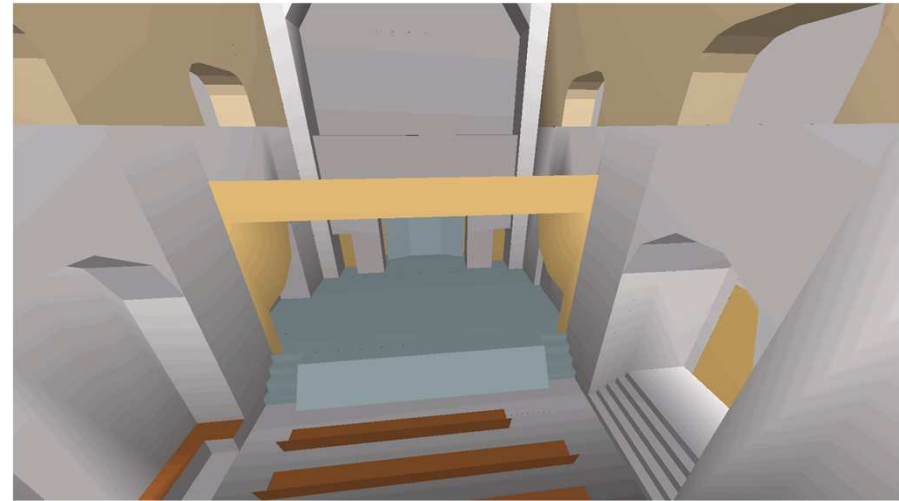
Highway tunnel grid for fire and smoke modelling



Acoustic simulations

Advanced analytical and numerical modelling for simulation of the indoor and outdoor sound propagation to meet legal requirements imposed by authorities for a wide range of acoustic characteristics:

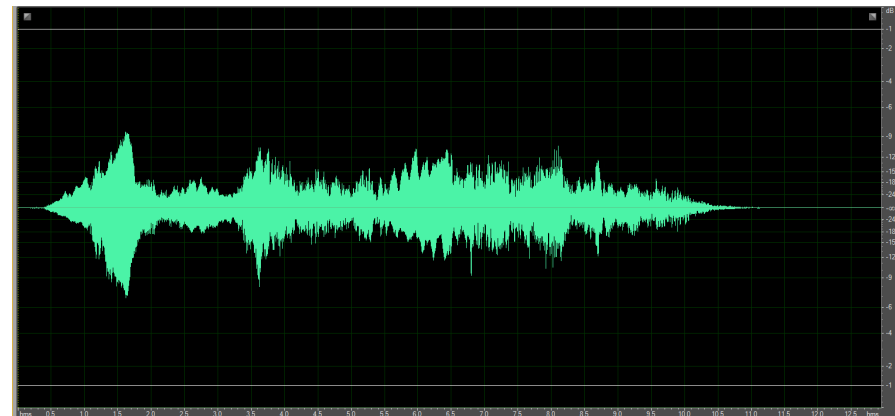
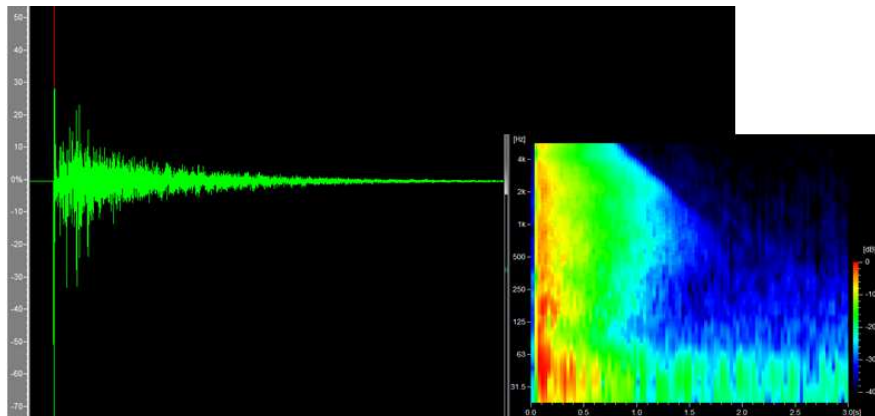
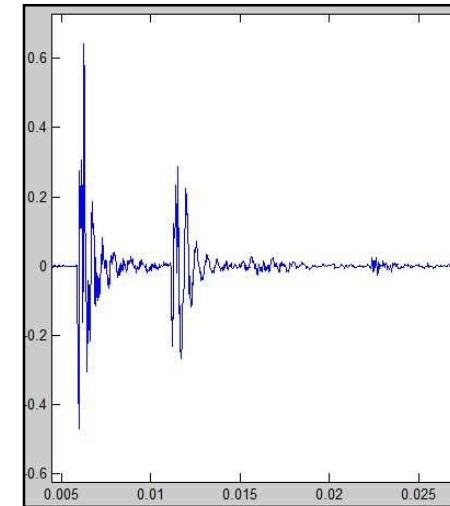
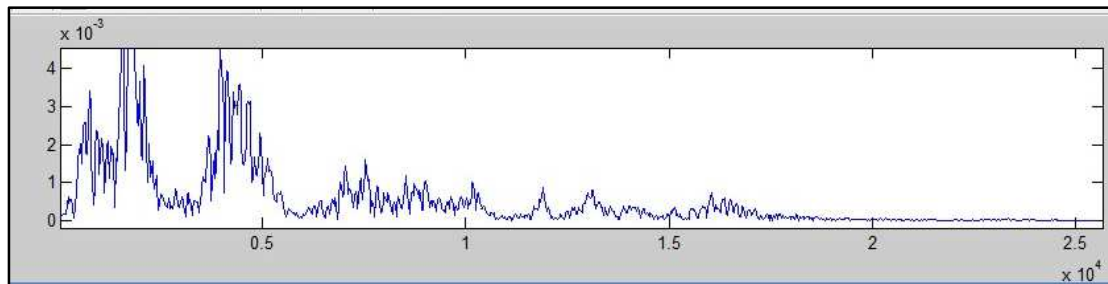
- Noise levels
- Airborne and impact sound insulation
- Reverberation time
- Acoustic quality of rooms



Audio signal processing

Advanced audio signal processing techniques for several purposes:

- to assess the authenticity of audio recordings
- to improve the intelligibility of conversations recorded by hidden microphones
- to make audio recording interpretations as objective as possible
- to perform complex analysis for system behaviour assessment



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Assess and prevent failures

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