# *fluidyn*-VENTEX

DEFLAGRATIONS / DETONATIONS IN CONFINED SPACES

fluidyn-**VENTEX** is a numerical tool dedicated to 3D modelling of explosion, deflagrations and detonations in confined spaces.

fluidyn-**VENTEX** is designed to be used in design by architects and engineers and in emergency management by emergency planners, rescuers, and fire-fighters.

As part of the Fluidyn family, *fluidyn*-**VENTEX** is integrated with other fluidyn modules for dispersion of flammable gases indoors or outdoors as well as for transient simulation of structural integrity for heat flux and for any gas or solid explosions
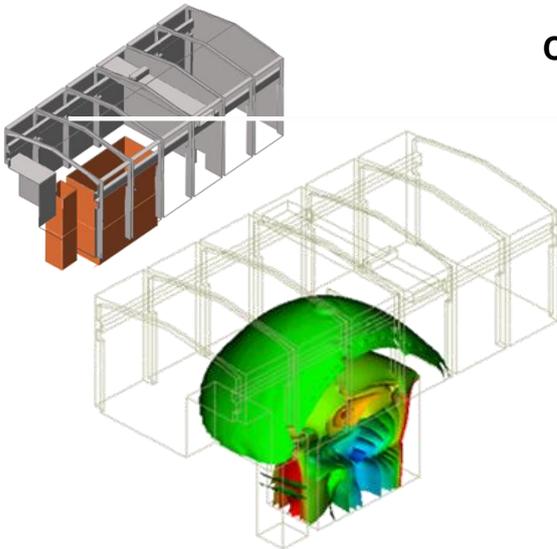

CAPABILITIES

- Deflagration
- Detonation
- Solid propellants
- Gas and liquid explosion
- Hydrogen explosion
- Pressure and combustion waves propagation in anisotropic environments
- Explicit obstacle description or equivalent porous zone
- Structural resistance and deformation
- Fire source localisation in real-time from sensor readings
- Evaluation of explosion accidents
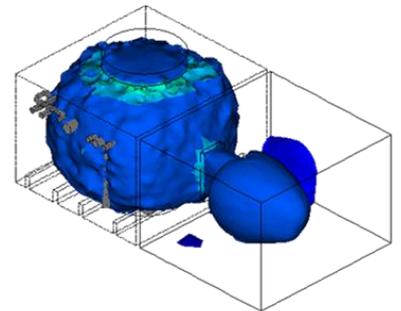
APPLICATIONS

- Evaluation of overpressures expected on sensitive targets
- Evaluation of the mitigation measures efficiency
- Surrounding structural response to pressure and thermal transient loads
- Domino effect and secondary explosion assessment
- Autoignition

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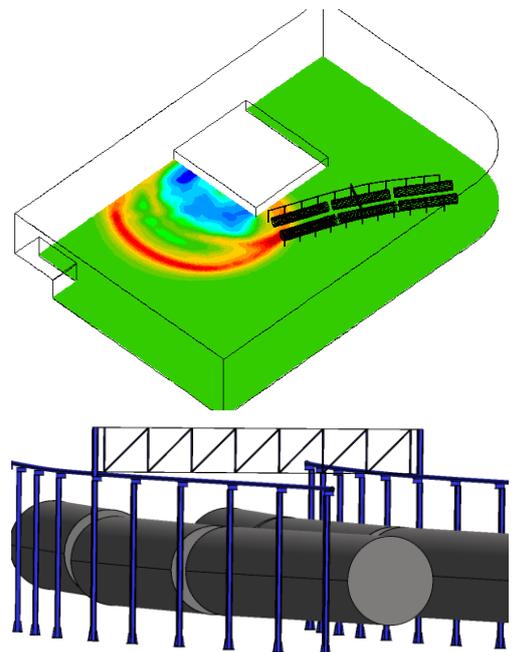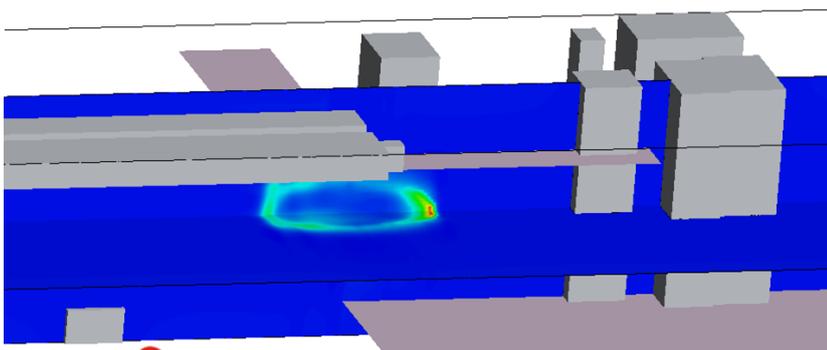
TECHNICAL ADVANTAGES

- Fast model preparation by data input on integrated CAD with built-in primitives
- Automatic or manual mesh
- CAD import from various formats (PDMS, IGES, DXF, STEP, etc.)
- Results projected on CAD model for faster design changes
- Explosion modelled by explicit or semi-implicit transient Finite Volume method
- Structural resistance to explosion by Finite Element solver
- Preprocessing by default assumptions for missing data
- Deflagration or detonation modelled with inbuilt appropriate parameters
- Optimal meshing by default besides user control, if required
- Multiple models for various kinds of explosions: BML, JWL, etc.
- Mitigation devices- blast walls, sprinklers, positioned graphically
- Material properties library with more than 400 solids, liquids, gas
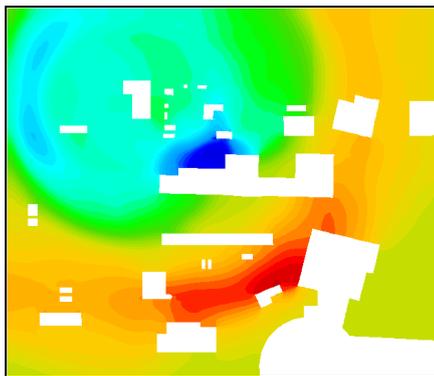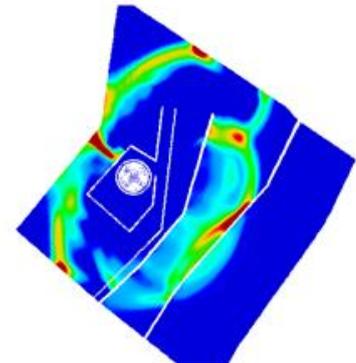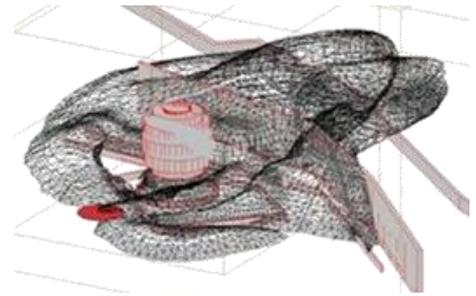
REQUIREMENTS

- Windows or Linux OS
- Parallelized solver
- Construction
- Batch as well as real time support mode
- Equipment library : blowers, exhausts, sprinklers, etc.
- Online connection from detectors and sensors
- Preprocessing and results visualisation on handheld devices
- Design variations tested graphically by optimisation algorithms

COUPLING

As a module of the *fluidyn*–MP software, *fluidyn*–VENTEX can include features of other *fluidyn*–modules :

- Ventilation and indoor air circulation, *fluidyn*–VENTCLIM
- Flammable gas evaporation and spread, *fluidyn*–PANACHE
- Real-time simulation of flow and jet dispersion, *fluidyn*–REALTI
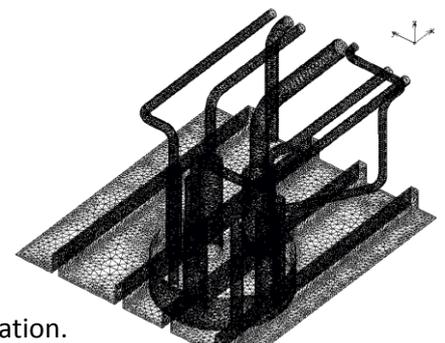
All *fluidyn*–MP software solvers are in constant development and constant validation.

The software are optimized and used since 1994 for many complex applications in nuclear and defence applications.

fluidyn–MP is still the only software, industrially available offering strong coupling of Finite Volumes and Finite Elements for complex applications.