

# TERRORISM MODELS - PAST AND FUTURE

ISCM Coffee Talk

20 May, 2022  
Jolyon Mitchell, London

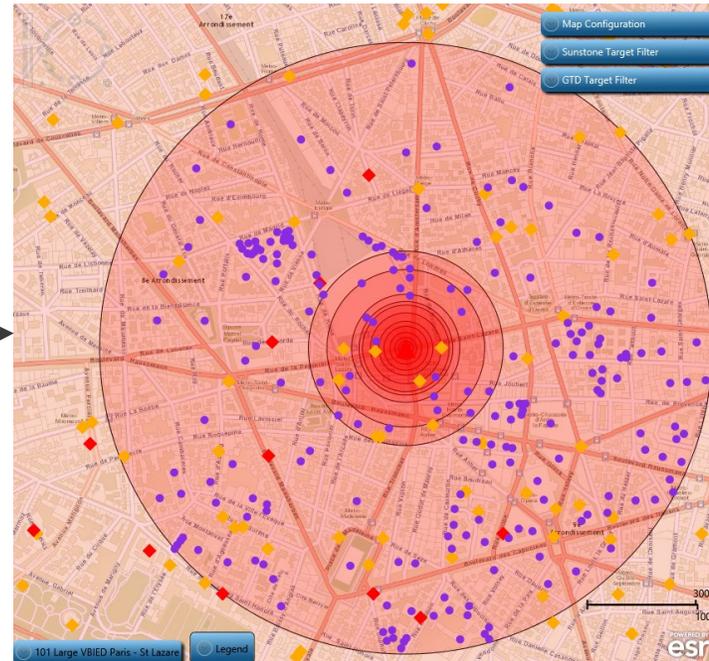
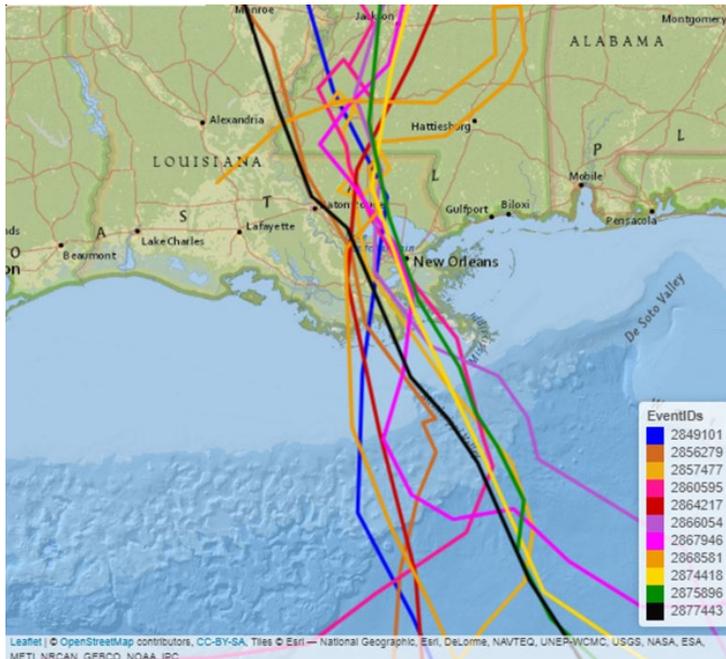
# Why Do Terrorism Models Exist?

- Following 9/11, insurers took much greater precautions in their approach to terrorism risk – governments took a greater role
- Large scale losses around the world came into greater focus
- Massive uncertainty in the market – insurance considered ‘incalculable’
- Large portfolios are at a unique threat from terrorism – the peril is driven by human intent, not by natural processes, as per other catastrophe perils
- Requirement for geographically precise risk management system with broad deterministic functionality
- Desire for robust quantitative methodological approach to loss projection
- New models emerged to fill this void – reinsurers needed to be able to view and manage their total exposure in very limited geographical spaces, as well as remain informed as to the probability of events.



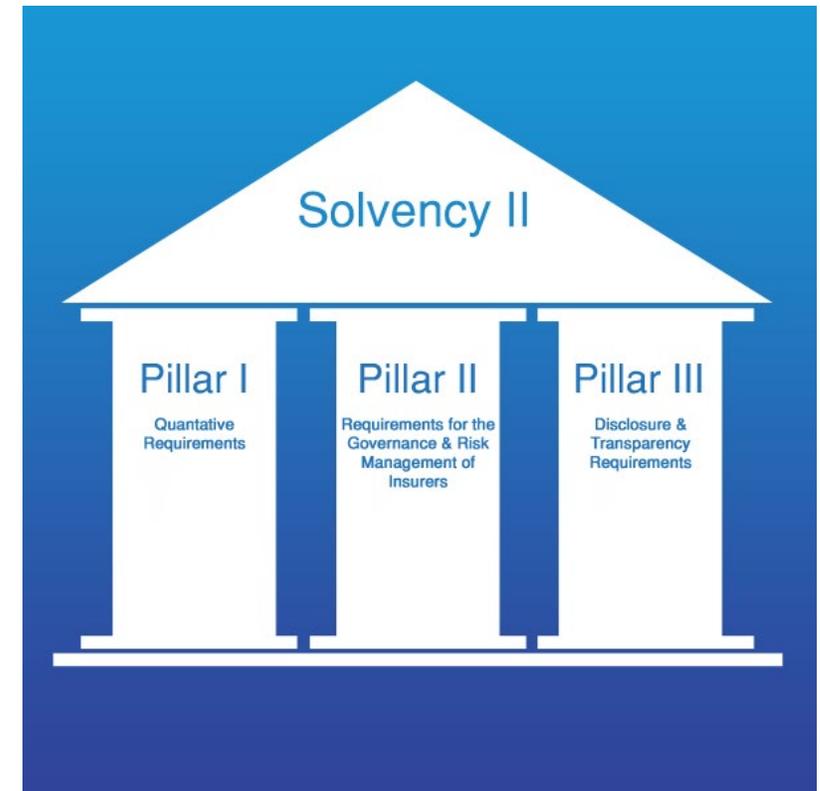
# Design Origins

- Hurricane Andrew (1992) and the Northridge Earthquake (1994) – two especially destructive events, drove development of catastrophe models
- Provide underwriters with data to control exposure, price risk and place optimum levels of reinsurance. They provide the scientific underpinning for underwriting decisions and are now an integral part of the insurance industry.
- Following the attacks on the World Trade Centre in September 2001 core elements of these systems were re-engineered and re-designed to help predict and quantify terrorism risk.
- Models are able to identify and assess multi-line exposures, concentration risk and portfolio hazards.



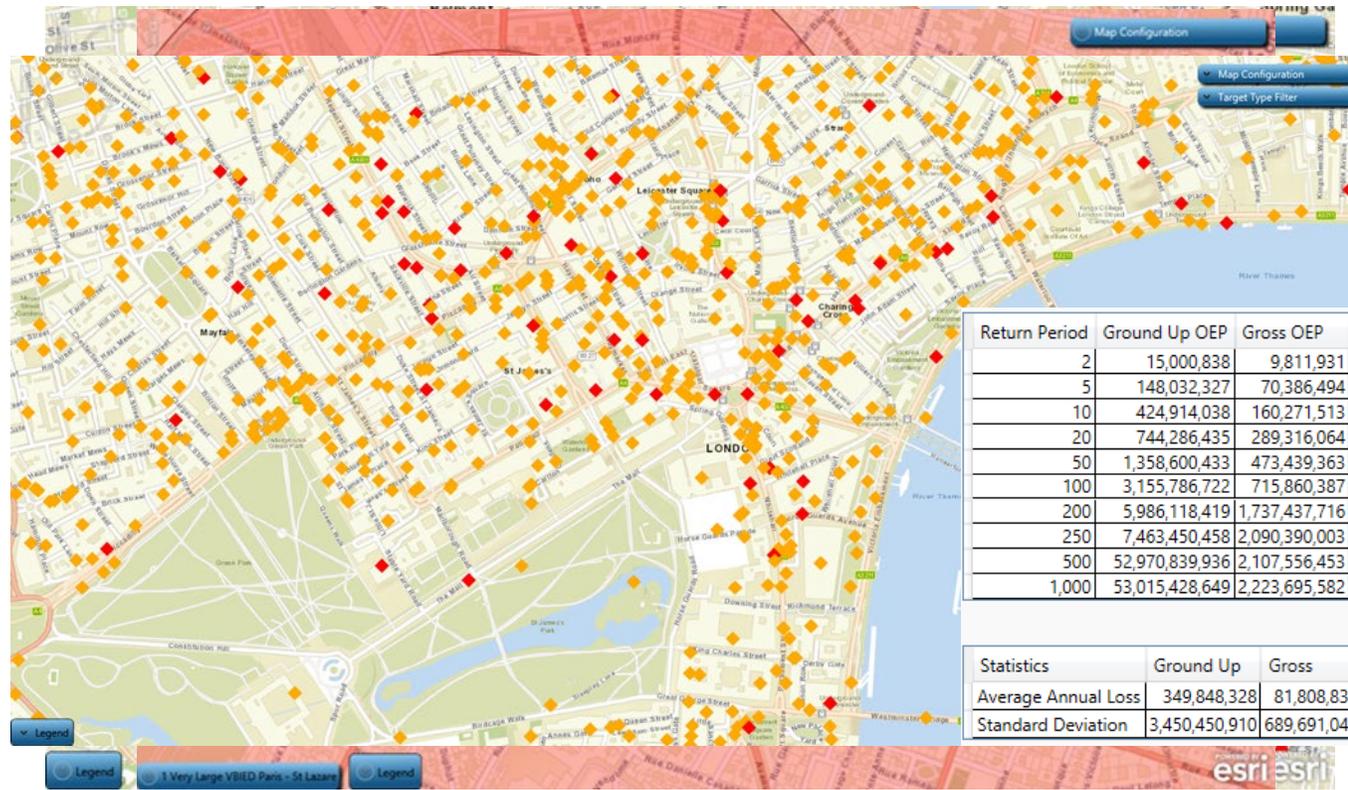
# Legislative Considerations

- TRIPRA
  - Protection for losses suffered in the USA in excess of USD 50 million (2006) to USD 200 million (2020)
  - Value of business in USA is dominant for global insurers – precise understand of exposures critical
  - Ongoing existence is called into question – removal of backstop raises significant underwriting concern
- Solvency II
  - EU legislation designed to improve risk management techniques
  - Need to demonstrate retention of adequate financial resources
  - Desire for better public disclosure and regulatory reporting requirements



# Functionality

- Current terrorism models in the insurance industry look to provide three forms of analysis:
  - Aggregation/Accumulation
  - Deterministic Scenarios
  - Probabilistic Analysis



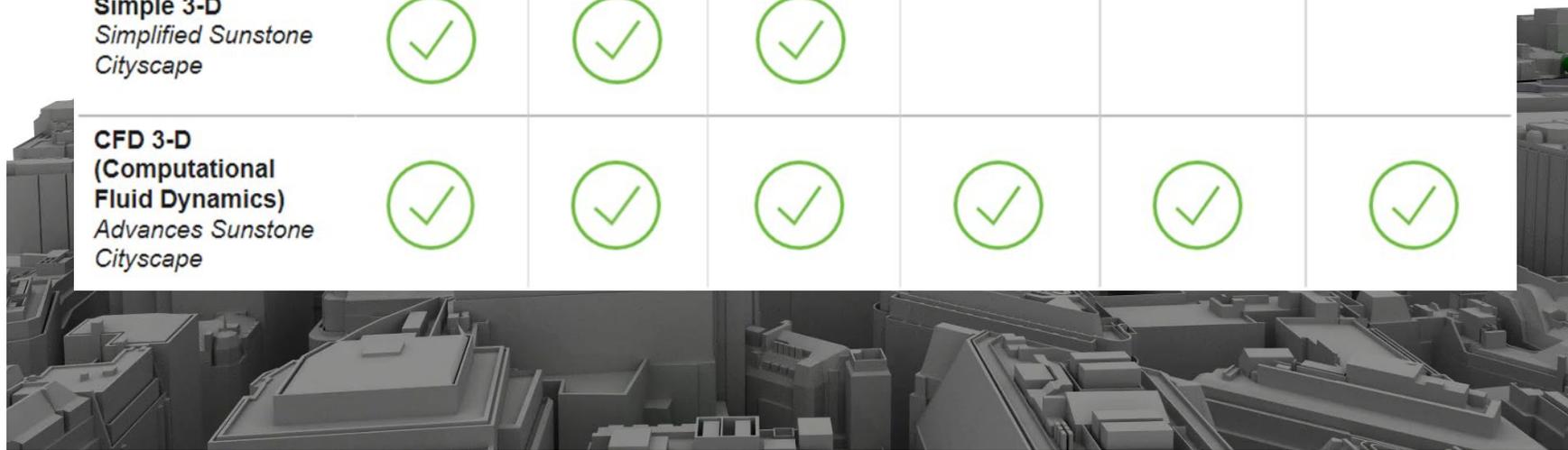
# Developments

## Building

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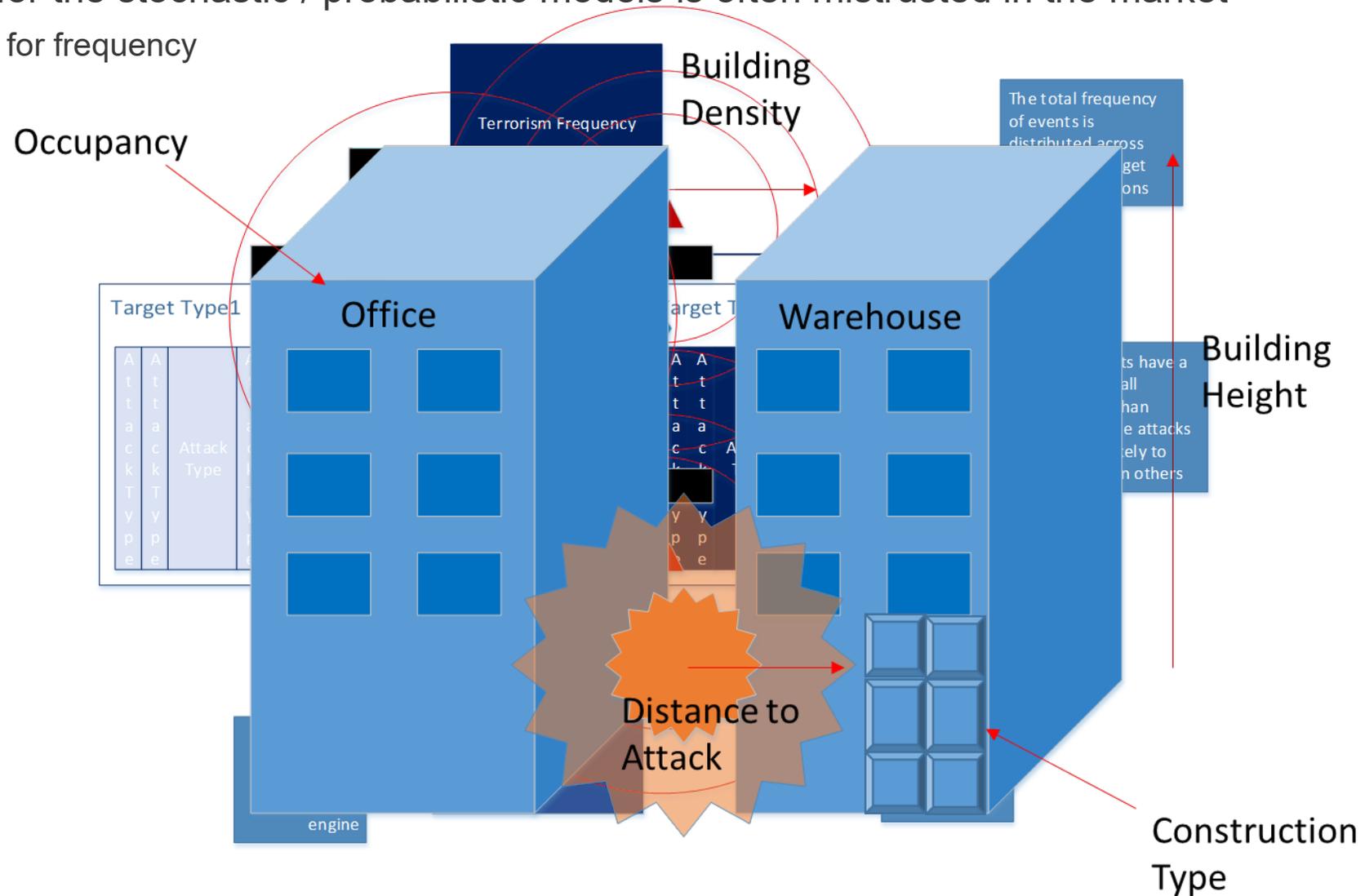
Modelling Type	Distance	Height	Angle	Reflections	Confinement	Shielding
<b>Concentric ring</b> <i>Commercial vendor models and Sunstone</i>	✓					
<b>Simple 3-D</b> <i>Simplified Sunstone Cityscape</i>	✓	✓	✓			
<b>CFD 3-D (Computational Fluid Dynamics)</b> <i>Advances Sunstone Cityscape</i>	✓	✓	✓	✓	✓	✓



type

# Concerns and Criticisms

- The methodology for the stochastic / probabilistic models is often mistrusted in the market
  - Assumptions taken for frequency
  - Target databases
  - Impact curves



# Future Development

- Closer integration of 3D modelling techniques to reduce unnecessary conservatism
- Expansion of the target databases?
- More quantitative inputs to frequency calculation
  - Climate change impacts
  - Unexplored correlators
  - New groups and ideologies – change of attack vector?



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