

# Managing Terrorism Risk in Touchstone



AIR WORLDWIDE®

# Agenda

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- Overview of the AIR Terrorism Model
- Terrorism risk management using Touchstone®
- The evolving terror risk insurance landscape:
  - Modeling global terror threats
  - TRIA case study

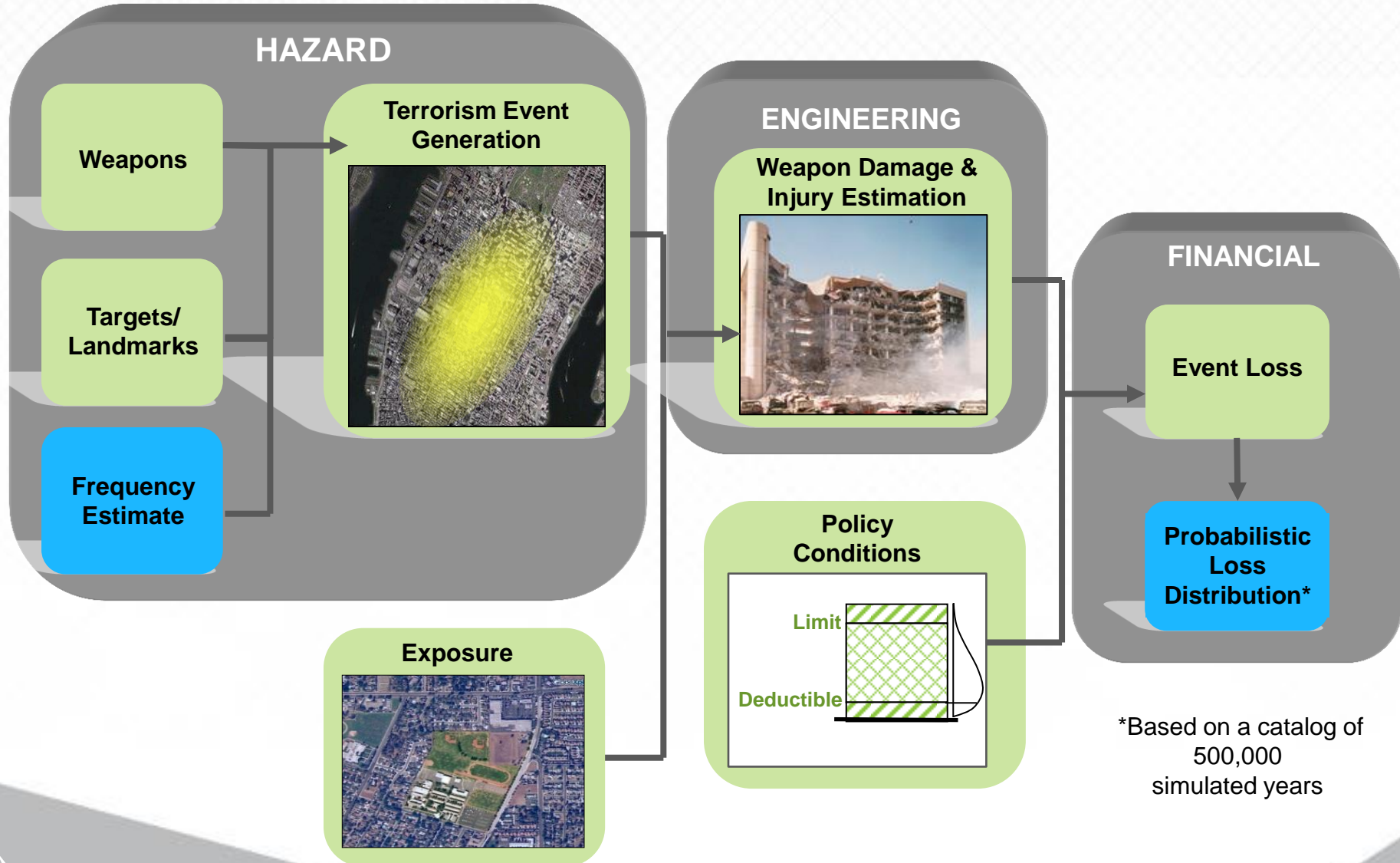


# Overview of the AIR Model for Terrorism



*Peter Bingenheimer, CCM*

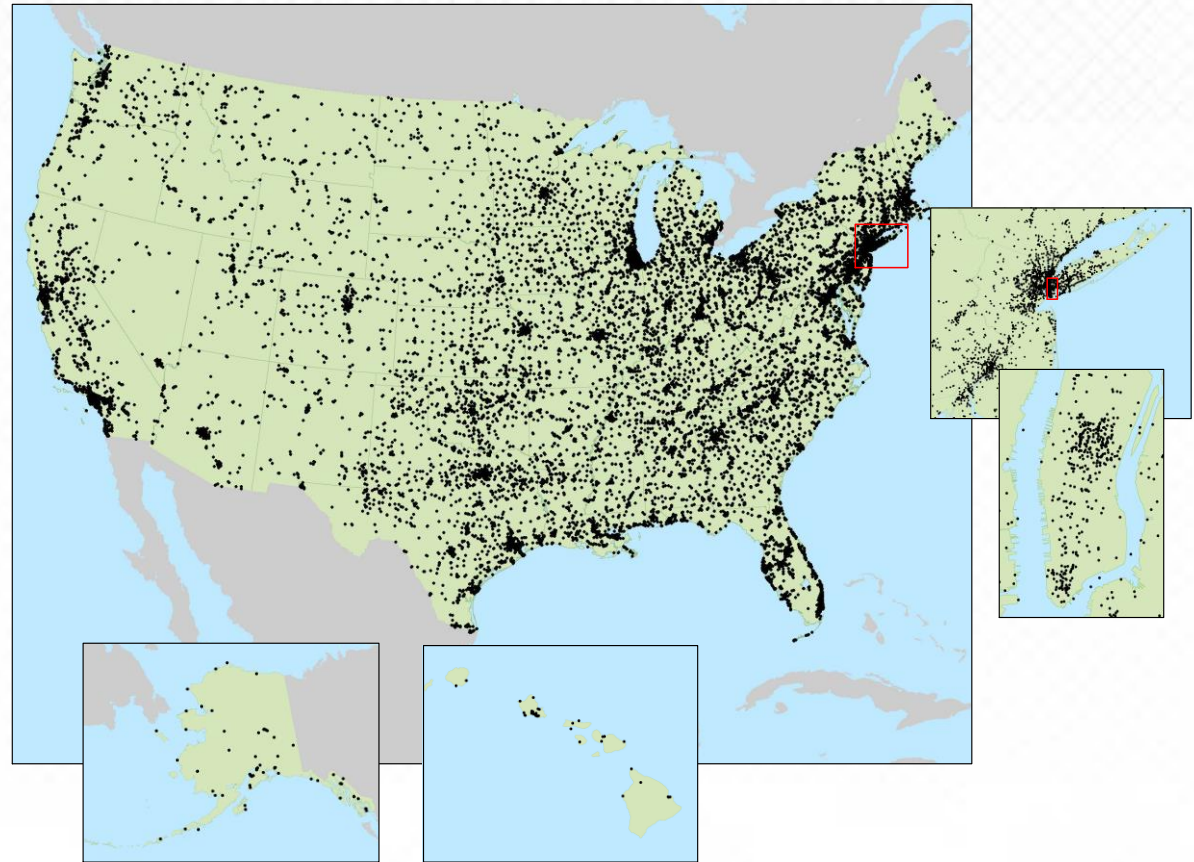
# AIR Terrorism Model Framework



\*Based on a catalog of  
500,000  
simulated years

# AIR Target Database Includes a Full Spectrum of Potential Targets in All 50 States

- Commercial
  - Prominent buildings
  - Corporate headquarters
  - Transportation hubs
  - Chemical plants
  - Energy and power facilities
  - Malls
  - Hotels and casinos
  - Amusement parks
  - Sports venues
- Government
  - Federal buildings
  - Embassies
  - State capitols
  - Post offices
- Other institutions
  - Educational
  - Medical
  - Religious



## AIR Landmark Database

- Approximately 300,000 potential targets used to create master catalog
- Over 41,000 selected in the stochastic catalog
- Includes approximately 100 Trophy Targets



# AIR Terrorism Model Includes Both Conventional and CBRN Weapons

## CONVENTIONAL

### **Vehicle bombs (Ton - TNT)**

- Portable (0.25)
- Car (0.75)
- Van (2.5)
- Delivery truck (6)
- Large truck (25)

### **Airplane crash**

- Small plane
- Large commercial airliner

## CBRN

### **Chemical\***

- Sarin (GB)
- VX Nerve

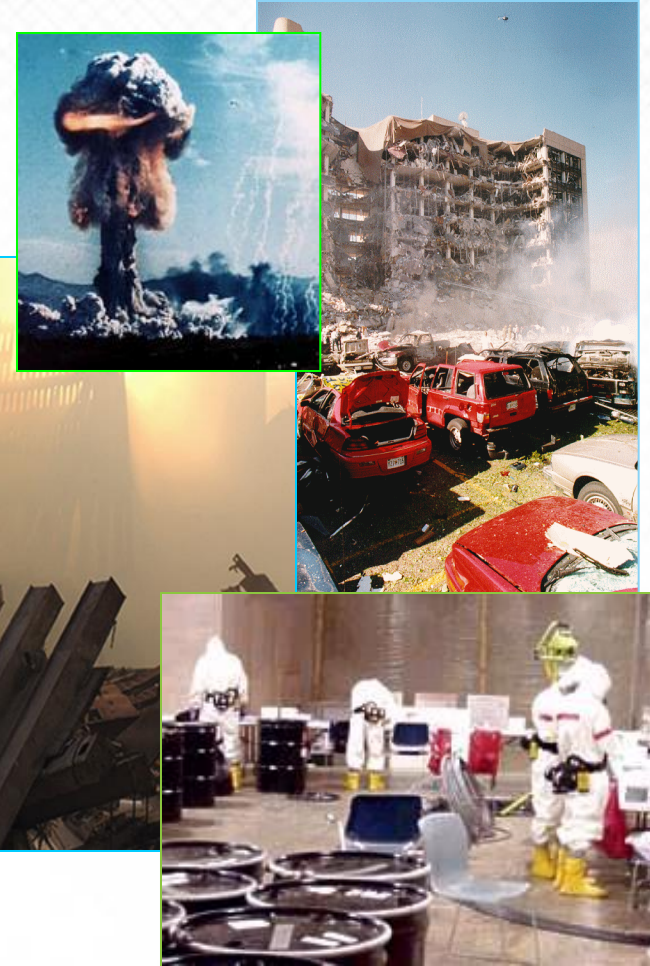
### **Biological\***

- Anthrax
- Smallpox

### **Radiological**

- Cesium 137
- Cobalt 60

### **Nuclear\***

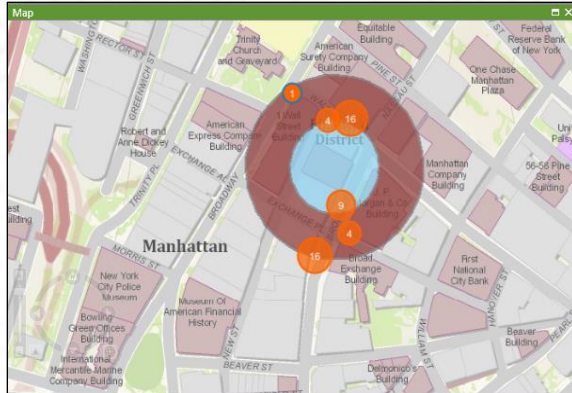


*\* Includes small, medium, and large*

# **Terrorism Risk Management Using Touchstone**

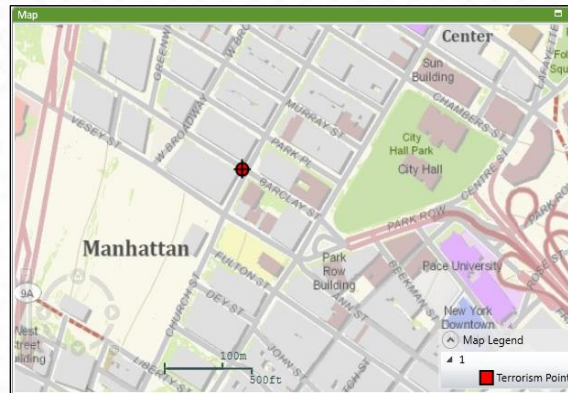


# What Methods Should Be Used to Manage Terrorism Risk?



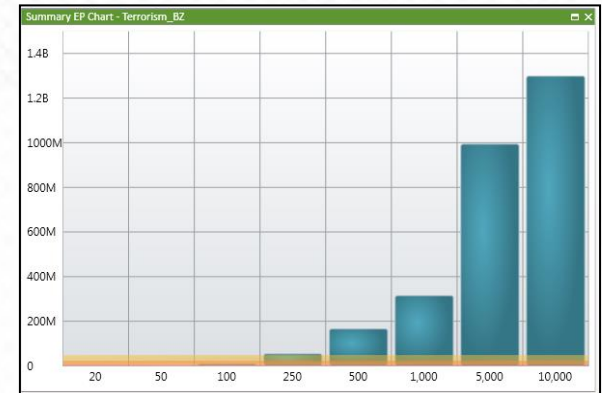
## Manage/Monitor Exposures

- Geospatial Analysis
  - Accumulate exposure values
  - Assign damage ratios within user-defined concentric rings
- Hazard Analysis
  - Identify accumulations in vicinity of terror landmarks



## Deterministic Modeled Loss Scenarios

- Conduct loss scenarios at points of accumulation
- Model attacks at locations of known or potential terror threats
- Assess impact of various weapon types on buildings and workers
- Determine net impact to losses after TRIA recovery



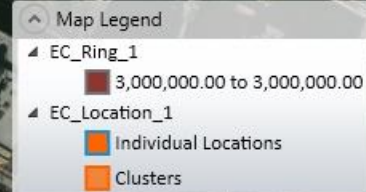
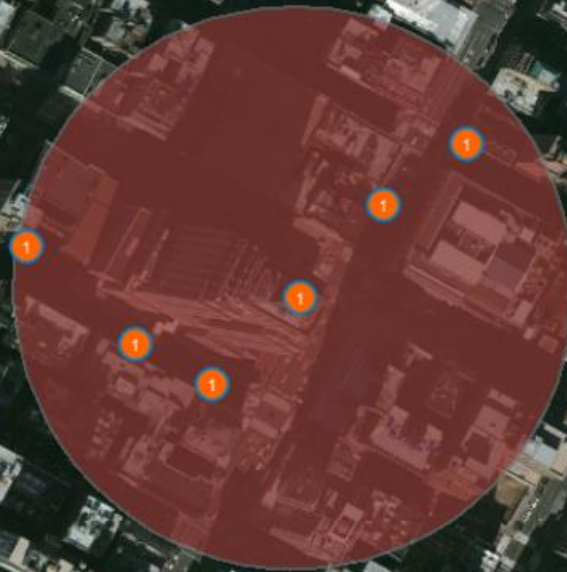
## Probabilistic Loss Analysis

- Illustrates full spectrum of loss potential and likelihood of terrorism events
- Supports pricing, portfolio management, and underwriting decisions
- Incorporates research and knowledge of counterterrorism experts



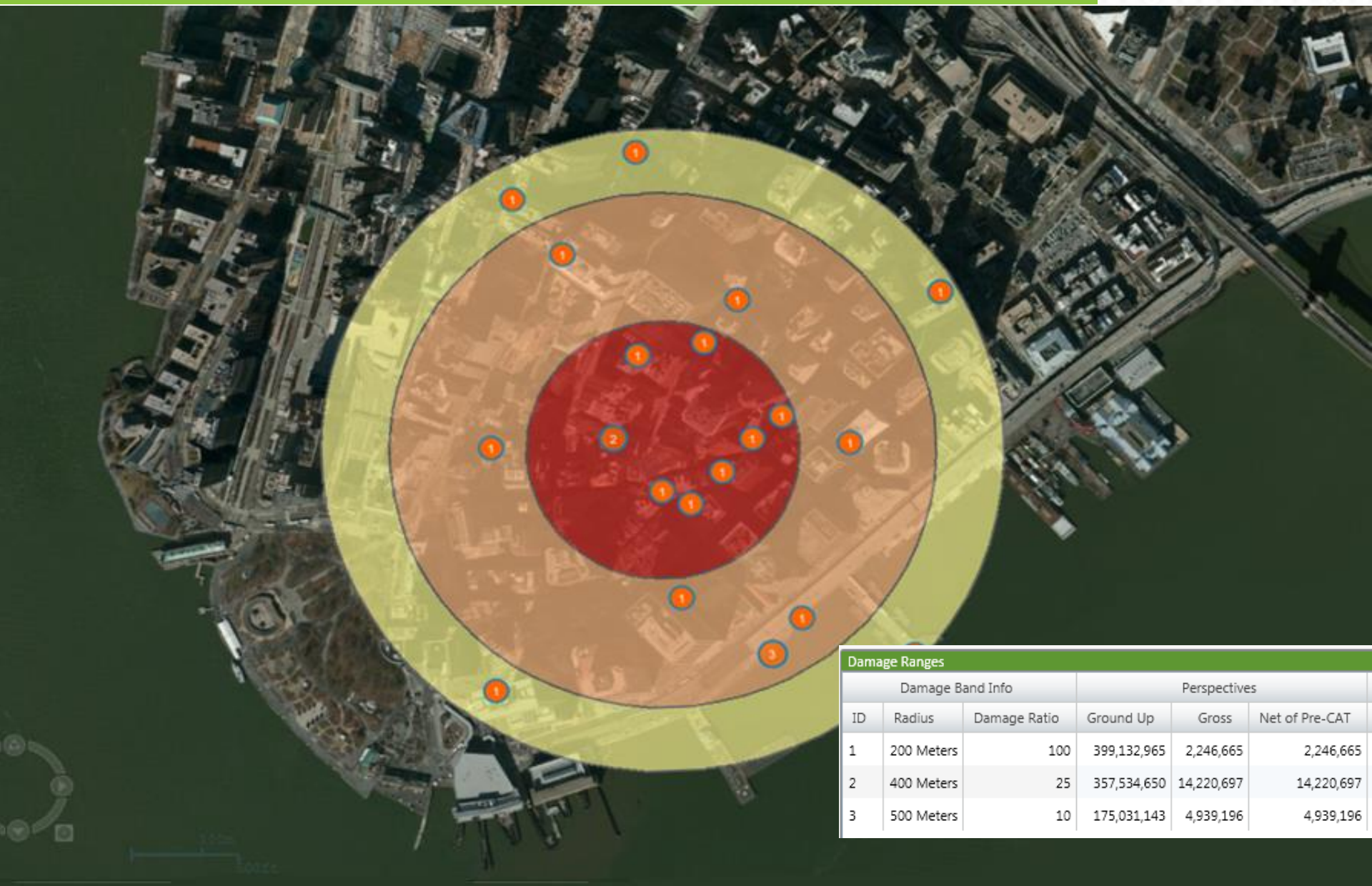
# Investigate Locations Contributing to Ring Analysis Accumulation

- Visually review proximity of exposures to terror target landmarks
- Establish underwriting rules to monitor accumulation at point of decision
- Respond to rating agency requirements



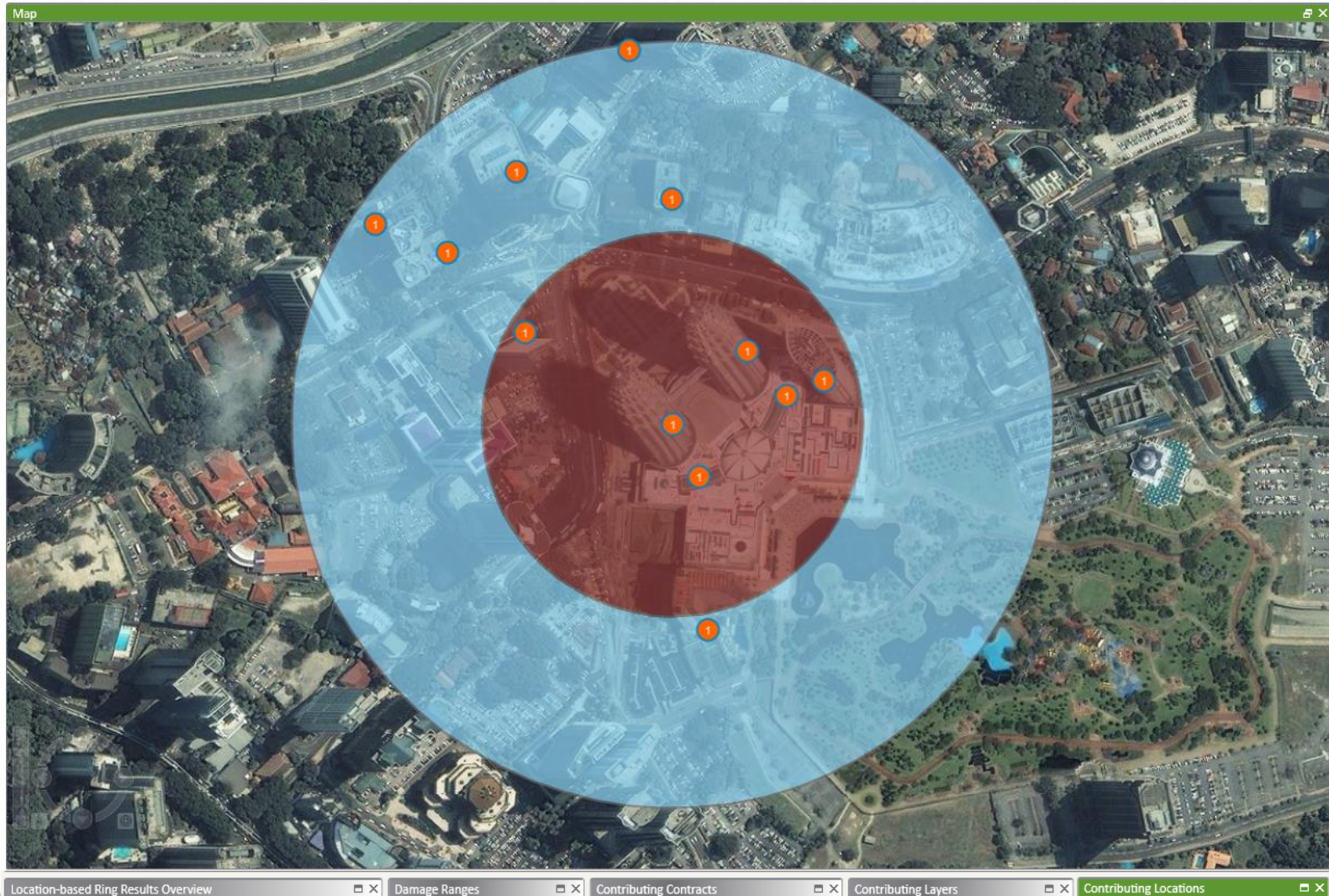


# Geospatial Analytics Allows for Straightforward Analysis of Lloyd's Realistic Disaster Scenarios





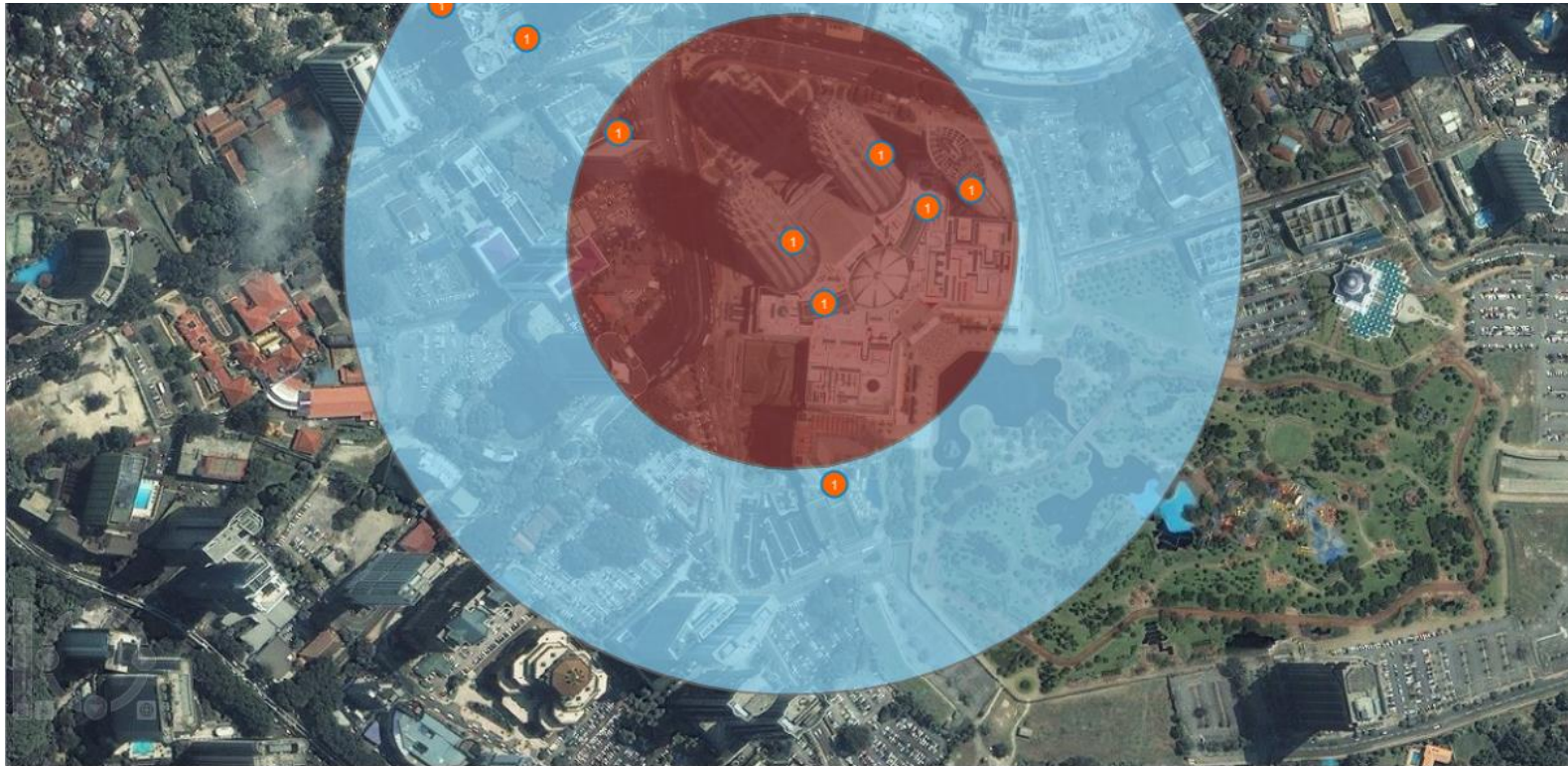
# Geospatial Analytics Enables You to Manage Terrorism Risk for Locations Anywhere in the World





# Geospatial Analytics Enables You to Manage Terrorism Risk for Locations Anywhere in the World

Map										
Damage Ranges										
Damage Band Info			Perspectives				Attributes			
ID	Radius	Damage Ratio	Ground Up	Gross	Net of Pre-CAT	Post-CAT Net	Total Replacement Value	Risk Count	Location Count	Peril
1	200 Metres	100	2,339,800,000	1,857,800,000	1,857,800,000		2,339,800,000	6	6	TR
2	400 Metres	25	53,950,000	53,950,000	53,950,000		215,800,000	6	6	TR



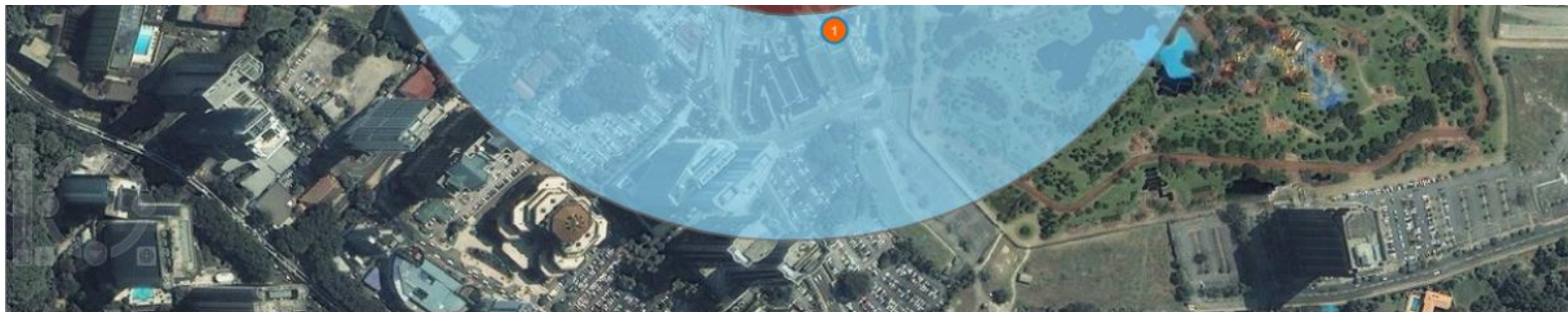
Location-based Ring Results Overview Damage Ranges Contributing Contracts Contributing Layers Contributing Locations



# Geospatial Analytics Enables You to Manage Terrorism Risk for Locations Anywhere in the World

## Contributing Locations

Location Info									
Insured Name	Location ID	Contract ID	Street	City	Area	Postal	Country	Geocode Match Level	Latitude
Ambank	1	1	8 Jalan Yap Kwan Seng	Kuala Lumpur			Malaysia	User Supplied	3.16125
The British Council	1	10	142 Jalan Ampang	Kuala Lumpur			Malaysia	User Supplied	3.159619
Twin Towers Medical Center	1	11	Suria Klcc Jalan Ampang	Kuala Lumpur			Malaysia	User Supplied	3.15723
AX Armani Exchange	1	2	50088 Kuala Lumpur	Kuala Lumpur			Malaysia	User Supplied	3.157994
Embassy of The Kingdom of Morocco	1	3	50450 Kuala Lumpur	Kuala Lumpur			Malaysia	User Supplied	3.159349
Malasian Rubber Research and Dev	1	4	148 Jalan Ampang	Kuala Lumpur			Malaysia	User Supplied	3.159852
Mandarin Oriental Hotel	1	5	50088 Kuala Lumpur	Kuala Lumpur			Malaysia	User Supplied	3.155784
Menara Public Bank	1	6	146 Jalan Ampang	Kuala Lumpur			Malaysia	User Supplied	3.160109
Pan Malaysia Pools Sdn Bhd	1	7	Kuala Lumpur City Centre	Kuala Lumpur			Malaysia	User Supplied	3.158138
Petronas Towers	1	8	1 Jalan Ampang	Kuala Lumpur			Malaysia	User Supplied	3.157723



Location-based Ring Results Overview ☐ Damage Ranges ☐ Contributing Contracts ☐ Contributing Layers ☐ Contributing Locations ☒

# Underwriters Can Identify a Location's Proximity to Terror Landmarks Using the Hazard Analytics Module

The screenshot displays the 'New Hazard Analysis' window. On the left, under 'Hazard Diagnostics', 'Terrorism' is selected. Under 'Exposure Diagnostics', 'Exposure Attributes' is selected. The 'Analysis Target' is 'AIRExpView\_Terror\_COM\_AL\_Iloyds'. The 'Terrorism Profile Options' section has two columns: 'Return Values' and 'Flag Values'. 'Return Values' has 'Distance to Landmark' and 'Landmark Types' checked. 'Flag Values' has a distance of '0.05 Miles' and a list of landmark types. The list includes 'Commercial', 'Hotel', and 'Prominent Building', all of which are checked. The list also includes 'Airport', 'Amusement Park', 'Bridge', 'Bus Terminal', 'Capitol', 'Chemical Plant', 'Embassy', 'Event Venue', 'Federal Building', 'Higher Education', 'Mall', 'Medical', 'Natural Gas', 'Nuclear Power Plant', 'Oil Refinery/Storage', 'Port', 'Power Plant', 'Religious', 'Subway Station', and 'Train Station'.

**New Hazard Analysis**

Analysis Target: AIRExpView\_Terror\_COM\_AL\_Iloyds

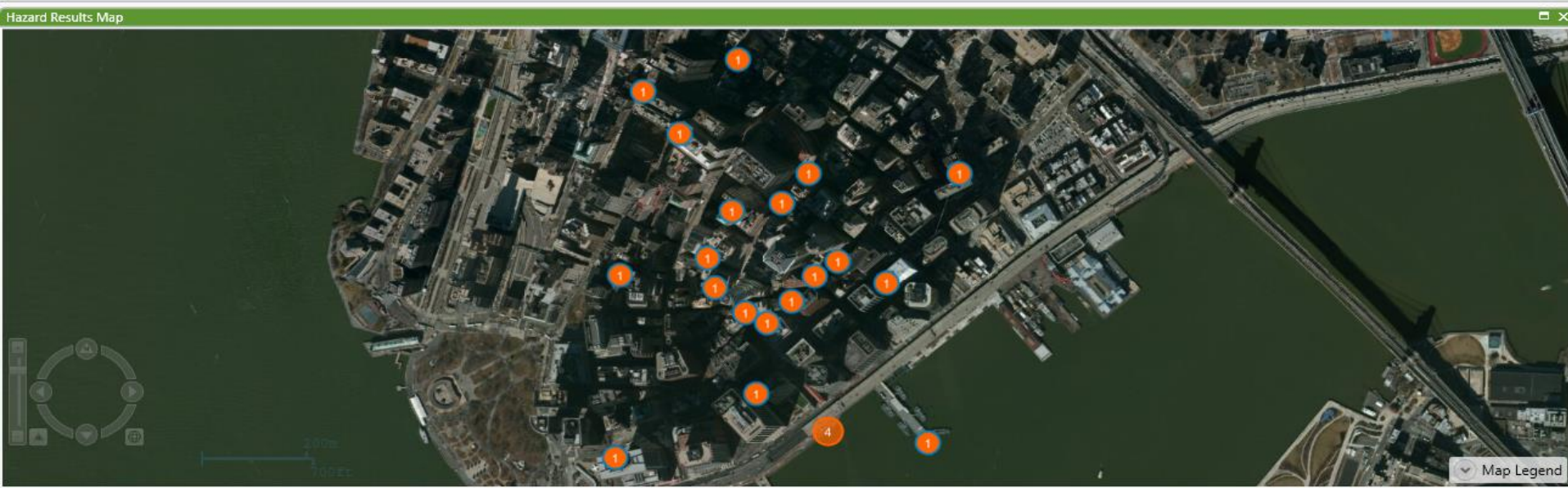
**Terrorism Profile Options**

Return Values:	Flag Values:
<input checked="" type="checkbox"/> Distance to Landmark	0.05 Miles
<input checked="" type="checkbox"/> Landmark Types	<input checked="" type="checkbox"/> Commercial
	<input checked="" type="checkbox"/> Hotel
	<input checked="" type="checkbox"/> Prominent Building
	<input type="checkbox"/> Airport
	<input type="checkbox"/> Amusement Park
	<input type="checkbox"/> Bridge
	<input type="checkbox"/> Bus Terminal
	<input type="checkbox"/> Capitol
	<input type="checkbox"/> Chemical Plant
	<input type="checkbox"/> Embassy
	<input type="checkbox"/> Event Venue
	<input type="checkbox"/> Federal Building
	<input type="checkbox"/> Higher Education
	<input type="checkbox"/> Mall
	<input type="checkbox"/> Medical
	<input type="checkbox"/> Natural Gas
	<input type="checkbox"/> Nuclear Power Plant
	<input type="checkbox"/> Oil Refinery/Storage
	<input type="checkbox"/> Port
	<input type="checkbox"/> Power Plant
	<input type="checkbox"/> Religious
	<input type="checkbox"/> Subway Station
	<input type="checkbox"/> Train Station

# Underwriters Can Identify a Location's Proximity to Terror Landmarks Using the Hazard Analytics Module

Hazard Results Table													
<input type="checkbox"/> Earthquake Profile <input type="checkbox"/> Tropical Cyclone Profile <input type="checkbox"/> Exposure Attribute Profile <input type="checkbox"/> Flood Profile <input type="checkbox"/> Severe Thunderstorm Profile <input checked="" type="checkbox"/> Terrorism Profile													
Location ID	Contract ID	Location Details							Terrorism Profile Details				
		Address	State	City	Country	Postal Code	Total Replacement Value	Geocode Match Level	Latitude	Longitude	Distance To Nearest Landmark	Nearest Landmark Type	
Loc1	Policy14		New York	NEW YORK	United States	10005	500000	User Supplied	40.703144	-74.007471	0.0642963364254625	Port	
Loc10	Policy14		New York	NEW YORK	United States	10005	1000000	User Supplied	40.705986	-74.007644	0.0468601321029302	Prominent Building	
Loc11	Policy14		New York	NEW YORK	United States	10005	1000000	User Supplied	40.706051	-74.010648	0.0494565334515385	Prominent Building	
Loc12	Policy14		New York	NEW YORK	United States	10005	1000000	User Supplied	40.705490	-74.010488	0.0568676439086434	Prominent Building	
Loc13	Policy14		New York	NEW YORK	United States	10005	500000	User Supplied	40.703499	-74.009522	0.0566444596576865	Prominent Building	
Loc14	Policy14		New York	NEW YORK	United States	10005	1000000	User Supplied	40.707067	-74.008943	0.0231614474933965	Hotel	
Loc15	Policy14		New York	NEW YORK	United States	10004	500000	User Supplied	40.705712	-74.012702	0.0910318115802373	Subway Station	
Loc16	Policy14		New York	NEW YORK	United States	10006	500000	User Supplied	40.708374	-74.011310	0.025695454668551	Prominent Building	
Loc17	Policy14		New York	NEW YORK	United States	10005	500000	User Supplied	40.707634	-74.008317	0.0237202802469942	Prominent Building	
Loc18	Policy14		New York	NEW YORK	United States	10005	500000	User Supplied	40.705576	-74.006503	0.0978813347546844	Prominent Building	
Loc19	Policy14		New York	NEW YORK	United States	10004	500000	User Supplied	40.702299	-74.012812	0.0103032205687156	Commercial	

[First](#) | [Prev](#) 1 [Next](#) | [Last](#)





# Deterministic Terrorism Loss Analysis Is a Powerful Tool for Risk Management and Rating Agency Requirements

STATEMENT YEAR 2013 SRQ OF THE \_\_\_\_\_

A.M. Best#: \_\_\_\_\_

## X. TERRORISM SECTION (Continued)

Please refer to the Questionnaire Instructions for additional information on how to complete the exhibits in this section.

### 45. DETERMINISTIC LOSS METHOD (PRIOR TO REINSURANCE AND TRIPRA)

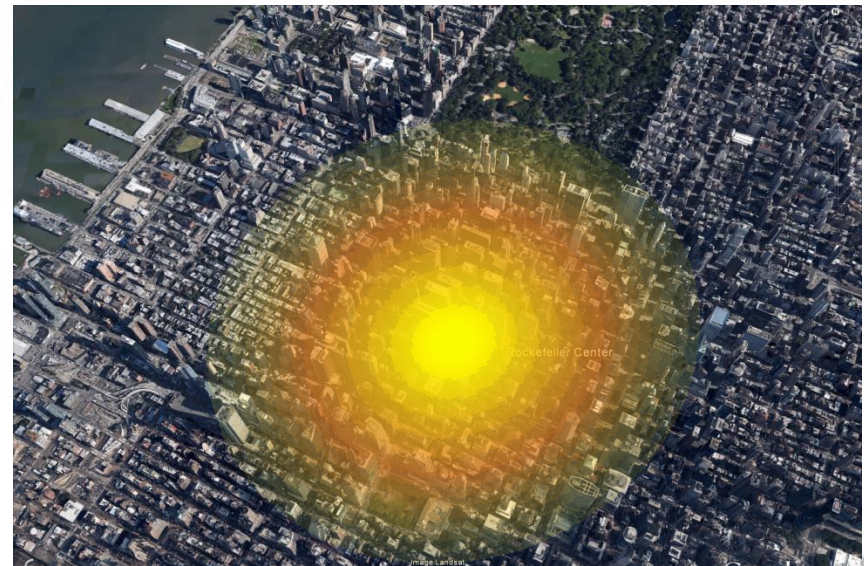
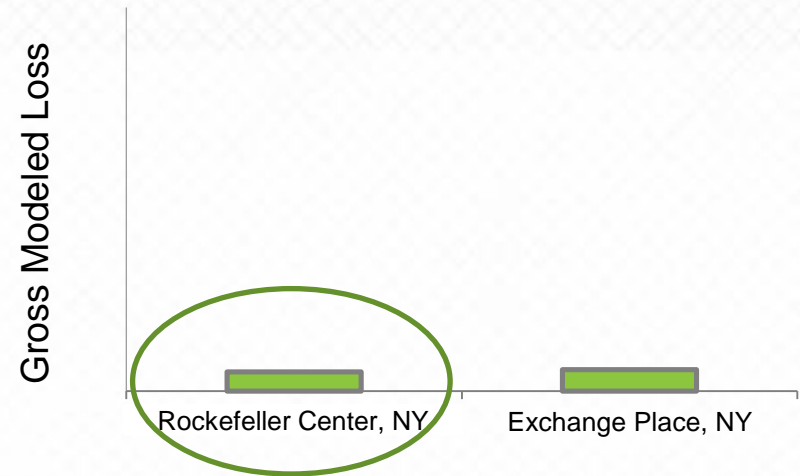
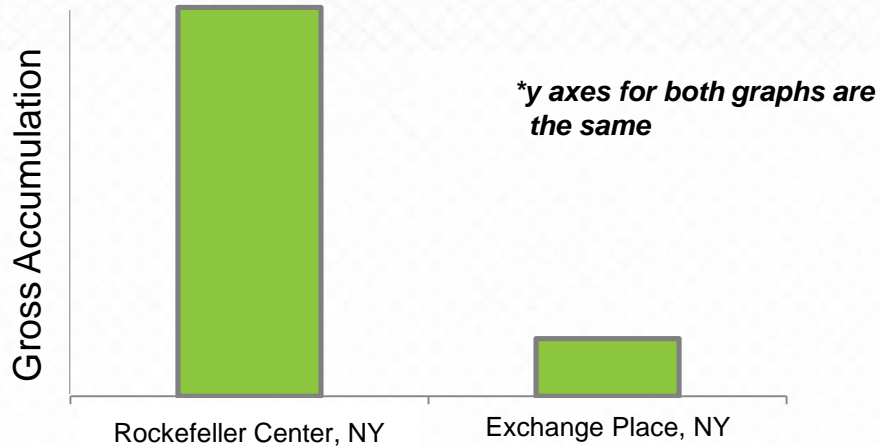
a. Assume the Specific Loss Scenario is located within the city limits of the following 5 cities: New York NY, Chicago IL, San Francisco CA, Washington DC, Los Angeles CA.

(01) Location of Attack (Street/ZIP, City, State)  (Rank based on Total Modeled Losses in column 06 which is the sum of Columns 03 through 05)	Modeled Primary Losses Prior to Reinsurance and TRIPRA					
	(02)  Average WC Loss per Employee (\$000)	(03)  Total Workers' Comp (\$000)	(04)  Total Property Including Business Interruption (\$000)	(05)  Total Other Coverages* (\$000)	(06)  Total Modeled Losses (\$000)	(07)  % of 2013 Group PHS
1.						
2.						
3.						
4.						
5.						

- Create custom terror attack scenarios while leveraging AIR's propagation algorithms, vulnerability functions, and trusted financial module
- Model deterministic terror loss scenarios for A.M. Best SRQ and S&P Terrorism Survey requirements for commercial property and workers' compensation exposures



# AIR's Deterministic Terrorism Analysis Shows Substantially Lower Accumulation than Lloyd's PML approach



# Probabilistic Loss Analysis Results Provide Value in Terrorism Risk Management

**Loss Analysis Options: Terrorism**

☒ Terrorism Covered

☒ Conventional - Domestic

☒ Conventional - International

☒ CBRN - Domestic

☒ CBRN - International

CBRN Exclusions

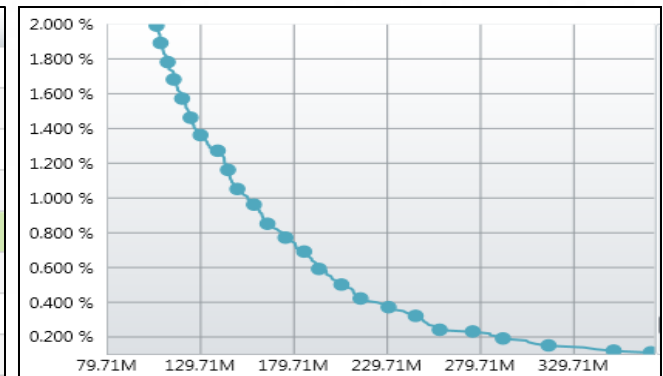
☒ Pollution Exclusion

☐ Bacteria and Virus Exclusion

☐ Terrorism Not Covered - Coverage solely provided by Standard Fire Policies(SFP)

- A consistent baseline for pricing analysis
- Compare different books of business
- Assess new submissions
- Compare different underwriting strategies
- Identify maximum loss scenarios
- Understand exposure to various attack types
- Estimate probabilities of extreme tail events

Agg/Occ	Perspective	AAL(EV)	SD	0.4%	0.2%	0.1%	0.07%	0.02%	0.01%
AGG	Ground Up	82,916	1,936,139	1,646,198	9,763,620	29,609,958	46,548,124	64,980,441	65,720,903
	Retained	37,104	1,176,986	737,453	2,342,003	9,717,674	16,648,922	27,684,764	58,583,735
	Gross	45,812	1,282,828	312,838	2,631,978	14,703,315	24,994,212	58,087,011	64,108,288
	Net of Pre-Cat	45,812	1,282,828	312,838	2,631,978	14,703,315	24,994,212	58,087,011	64,108,288
OCC	Ground Up	82,771	1,932,633	1,642,642	9,762,423	29,609,958	46,548,124	64,975,155	65,614,866
	Retained	37,057	1,176,706	736,432	2,328,448	9,717,674	16,641,057	27,684,764	58,583,585
	Gross	45,764	1,281,388	312,732	2,631,978	14,593,085	24,994,174	58,087,011	64,108,288
	Net of Pre-Cat	45,764	1,281,388	312,732	2,631,978	14,593,085	24,994,174	58,087,011	64,108,288



# The Evolving Terror Risk Insurance Landscape



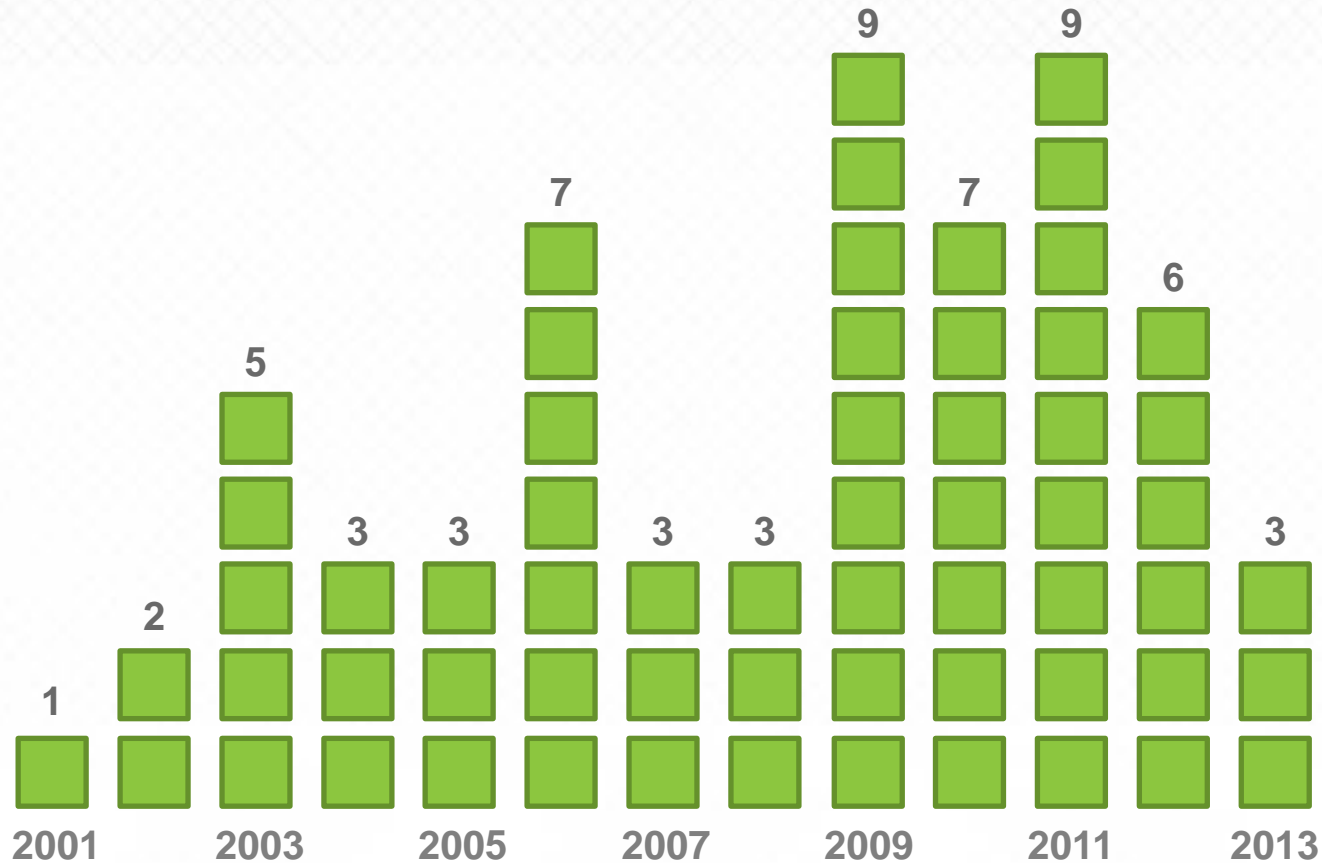
*Alissa Legenza, CCM*

# Expert Operational Threat Assessment Is Used to Generate Terrorism Model Event Catalog



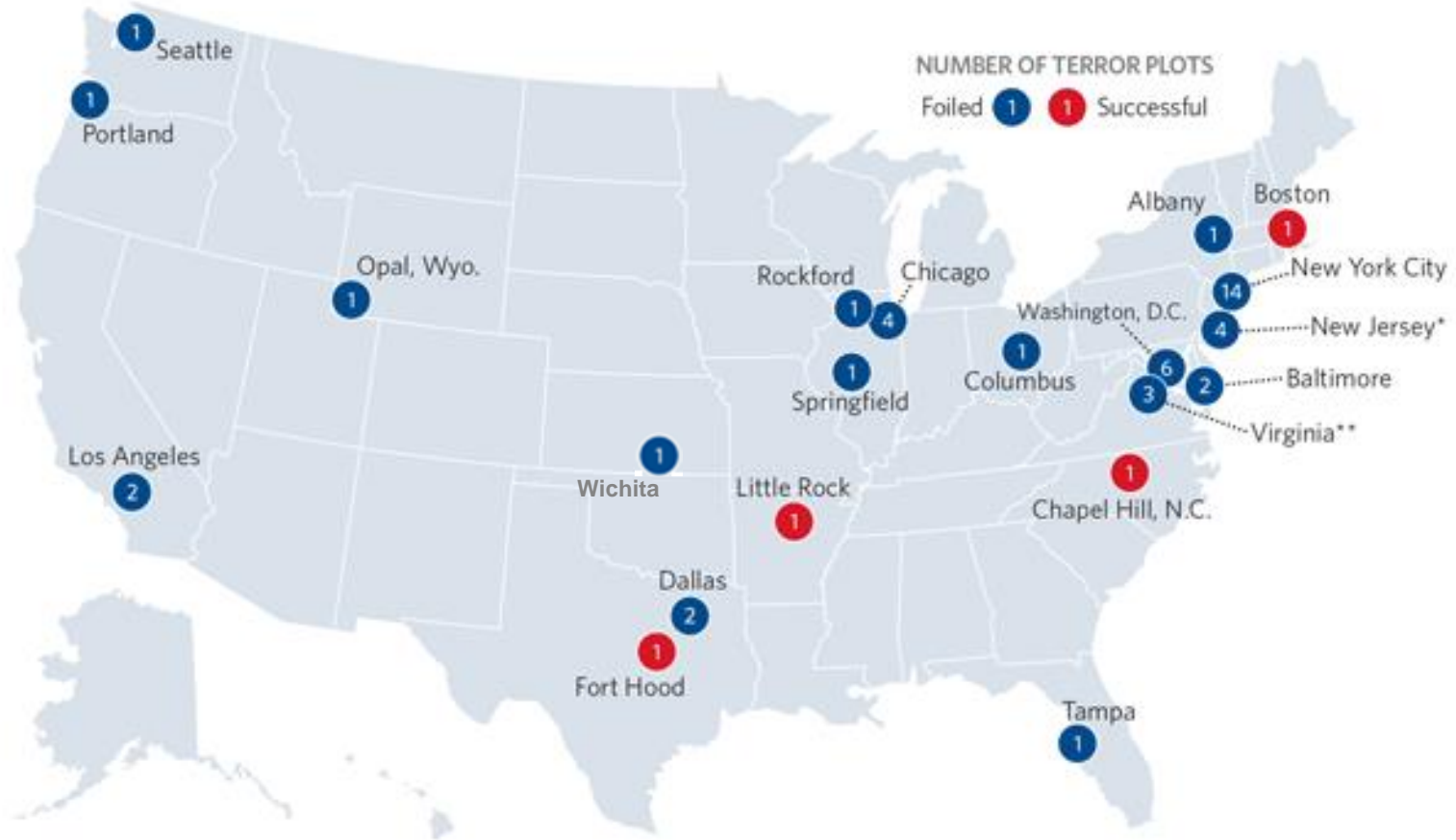


# Terror Plots Against the U.S. Since 9/11



*Source: Heritage Foundation*

# Terror Plots Against the U.S. Since 9/11



\* Newark, Perth Amboy, and Trenton \*\* The Pentagon (2) and Quantico Marine Corps Base

**Source:** Heritage Foundation research based on media reports and court documents.

SR 137  heritage.org

# Terrorism Risk Insurance Act (TRIA): Ensuring Protection to the Commercial P/C Insurance Industry

- Tragic Events of Sept. 11, 2001, resulted in over USD 42 Billion Insured Loss\*
- Congress responded to larger economic fears with Terrorism Risk Insurance Act in 2002:
  - Last extension of TRIA passed in 2007 (TRIPRA)
  - TRIA is set to expire on December 31, 2014
  - TRIA encourages affordability and availability of commercial terrorism insurance, especially for risks in terror-prone areas



*\*2013 Dollars: Insurance Information Institute*

# Loss Sharing Under TRIPRA for Certified Acts of Terrorism

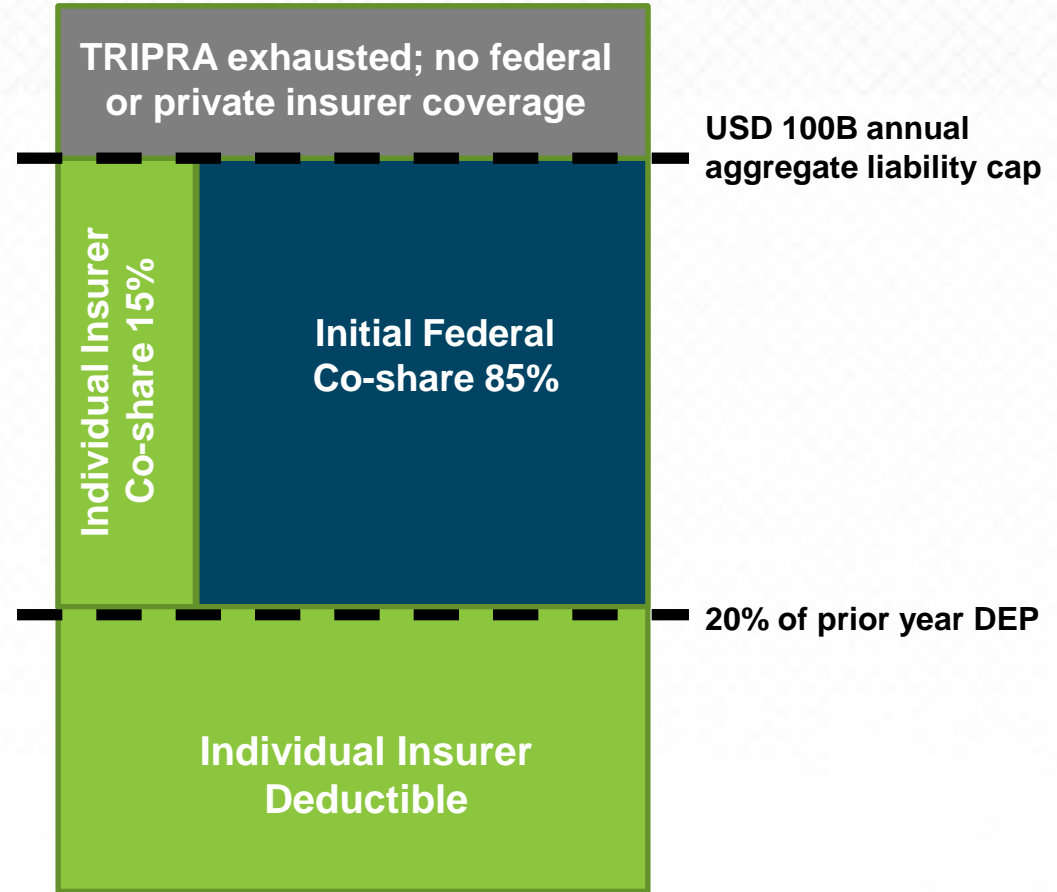
Act of terrorism resulting in industry insured losses of at least USD 5M to be eligible for certification

Insured losses must exceed program trigger of USD 100M for coverage to apply

Individual insurer deductible size based on 20% of prior year direct earned premium (DEP)

Annual cap on liability of USD 100B aggregate insured losses

Mandatory recoupment applies if uncompensated insurer losses below industry retention of USD 27.5B








Uncompensated Insurance Industry Loss Share

Initial Federal Loss Share

Uncompensated Policyholder Losses



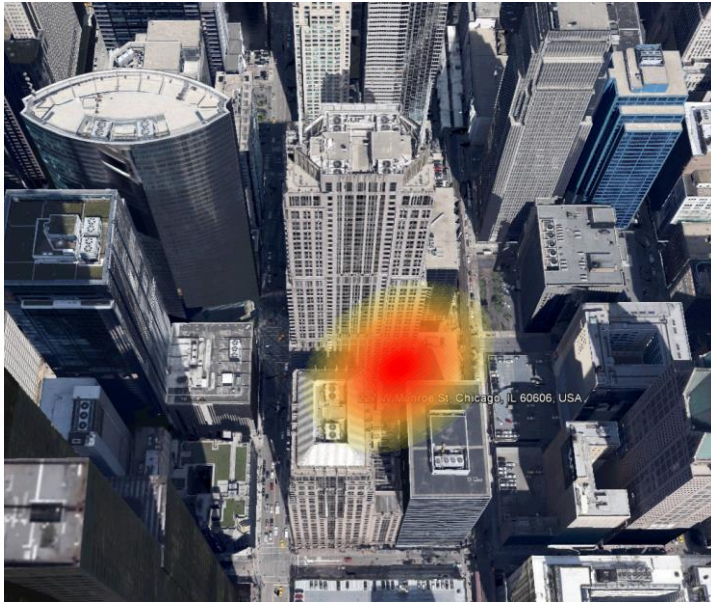
# What's Next for TRIA? Reduced Federal Role Based On House and Senate Reauthorization Proposals

	Senate Bill: S.2244	House Bill: H.R.4871
<b>Program Length</b>	7 years	5 years
<b>Program Trigger</b>	No change	Conventional  CBRN No change
<b>Insurer Deductible</b>	No change	No change
<b>Insurer Loss Share</b>		Conventional  CBRN No change
<b>Industry Retention (for mandatory recoupment)</b>		

Based on House and Senate positions as of October 21, 2014

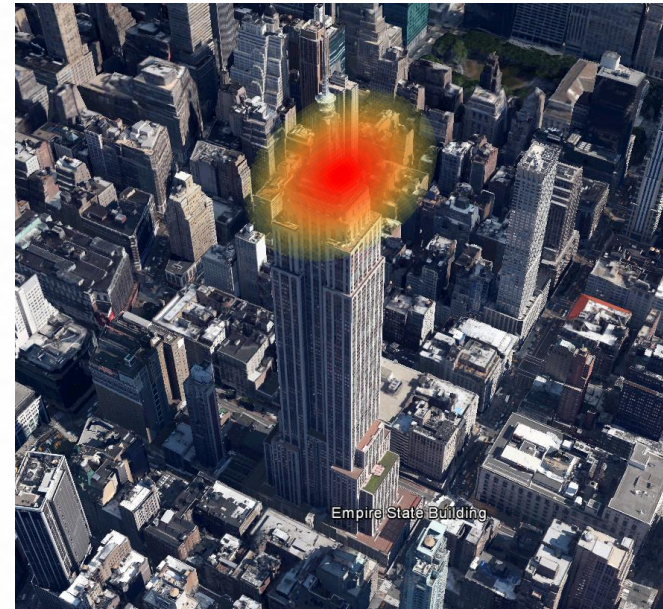
# TRIA Case Study: USD 40 Billion Conventional Terror Attack Insured Loss

## 25 Ton TNT Large Truck Bomb Blast Chicago, IL (Franklin Center)



Commercial Property	USD 18B
Workers' Compensation	USD 21B
Total Insured Loss	USD 39B

## Commercial Airplane Crash New York, NY (Empire State Building)



Commercial Property	USD 18B
Workers' Compensation	USD 22B
Total Insured Loss	USD 40B

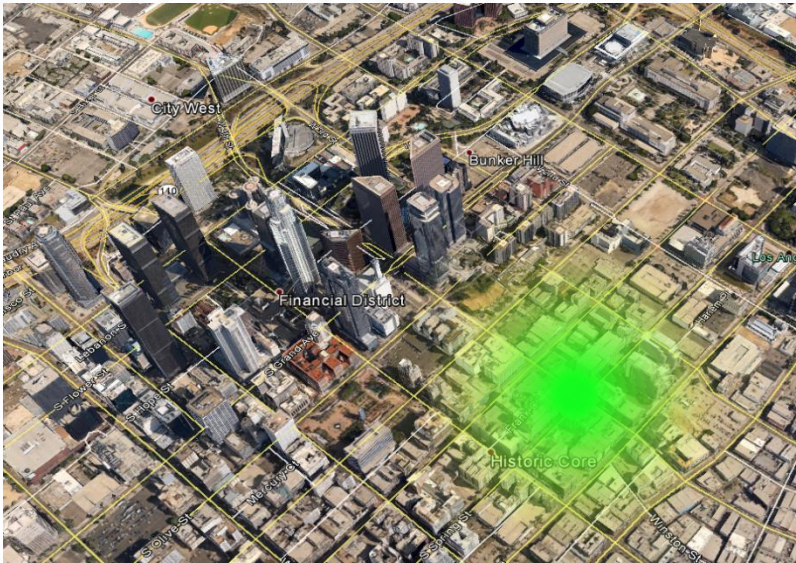
**Assumption:** 62% take-up rate for Commercial Property; 100% take-up for Workers' Comp.

**Note:** Attack simulation shown in images for illustrative purposes only.



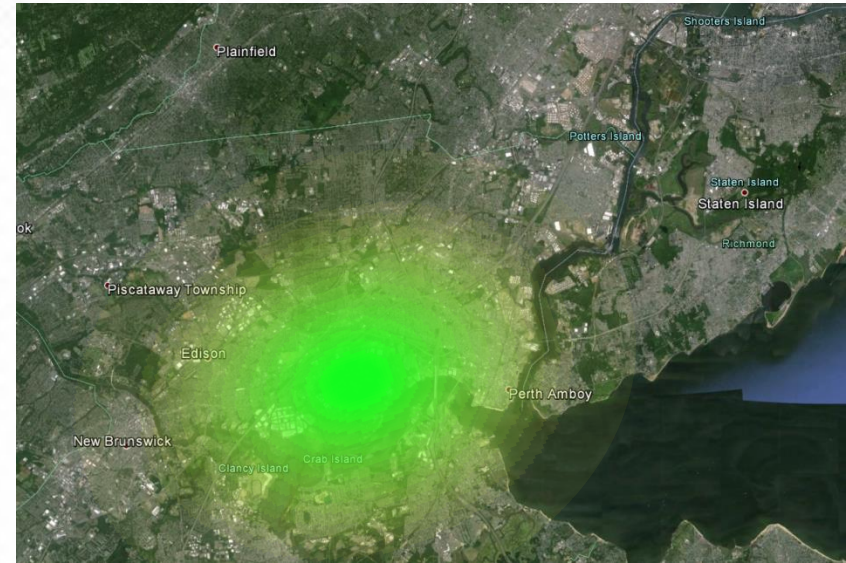
# TRIA Case Study: USD 40 Billion CBRN Terror Attack Insured Loss

## 1 kg VX Attack Los Angeles, CA



Commercial Property	USD 38B
Workers' Compensation	USD 1B
Total Insured Loss	USD 39B

## 0.1 kg Anthrax Attack Somerset, NJ

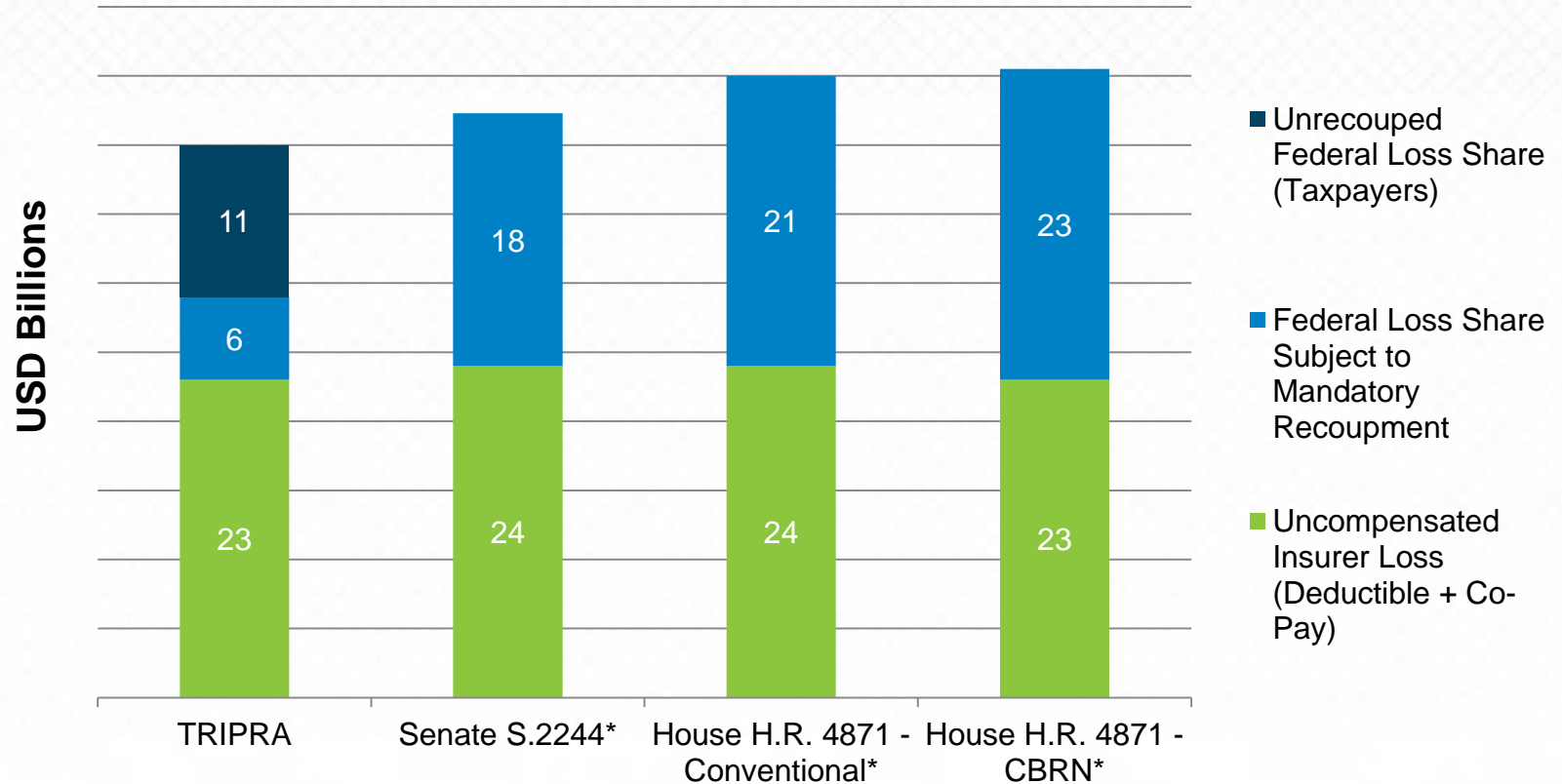


Commercial Property	USD 4B
Workers' Compensation	USD 36B
Total Insured Loss	USD 40B

**Assumption:** 62% take-up rate for Commercial Property; 100% take-up for Workers' Comp.

**Note:** Attack simulation shown in images for illustrative purposes only.

# TRIA Case Study: Loss Sharing Comparison for USD 40B Insured Loss Under Different TRIA Designs



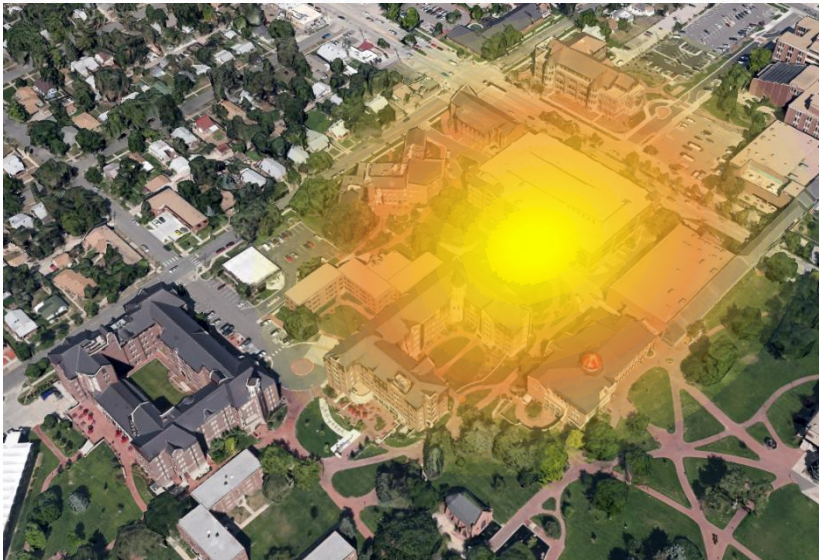
Total Insurer Deductible	USD 20B	USD 20B	USD 20B	USD 20B
Insurer/ Federal Co-Share	15% / 85%	20% / 80%	20% / 80%	15% / 85%
Industry Retention (for mandatory recoupment)	USD 27.5B	USD 37.5B	USD 38B	USD 38B
Rate of Recoupment	133%	135.5%	150%	150%

\*Based on Senate and House of Rep.'s position as of October 21, 2014



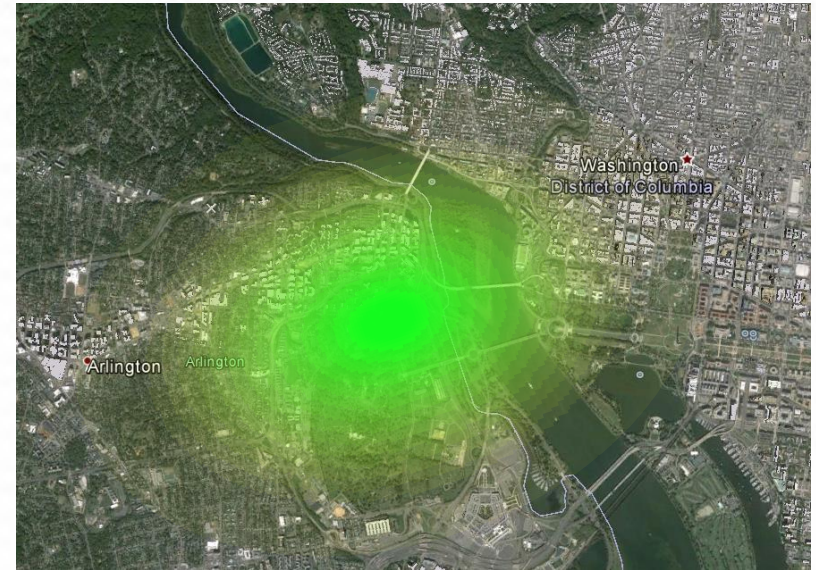
# TRIA Case Study: USD 150 Billion CBRN Terror Attack Insured Loss

## 50 kilotons Nuclear Attack Denver, CO (University of Denver)



Commercial Property	USD 3B
Workers' Compensation	USD 147B
Total Insured Loss	USD 150B

## 100 kg VX Attack Arlington, VA

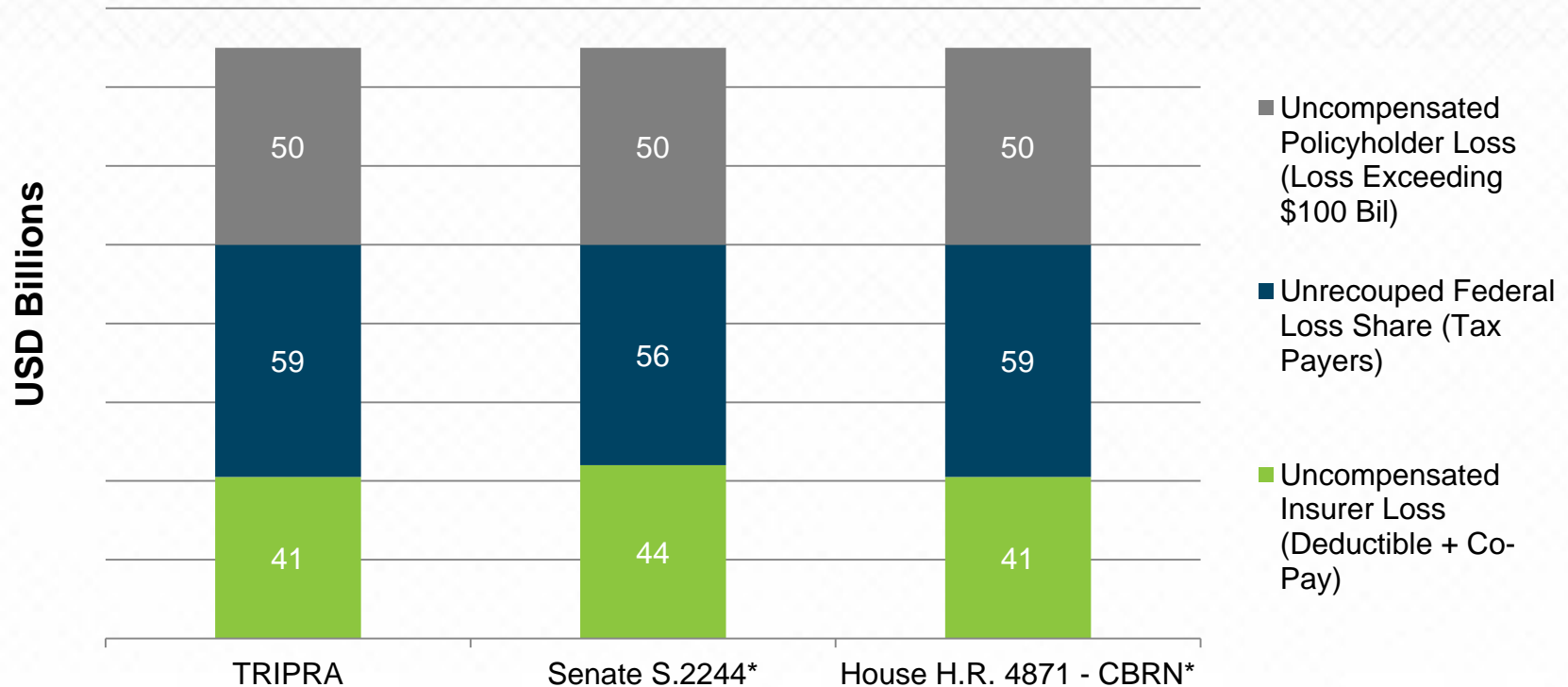


Commercial Property	USD 149B
Workers' Compensation	USD 4B
Total Insured Loss	USD 153B

**Assumption:** 62% take-up rate for Commercial Property; 100% take-up for Workers' Comp.

**Note:** Attack simulation shown in images for illustrative purposes only.

# TRIA Case Study: Loss Sharing Comparison for USD 150B CBRN Insured Loss Under Different TRIA Designs



Total Insurer Deductible	USD 30B	USD 30B	USD 30B
Insurer/ Federal Co-Share	15% / 85%	20% / 80%	15% / 85%
Industry Retention (for mandatory recoupment)	USD 27.5B	USD 37.5B	USD 38B
Rate of Recoupment	133%	135.5%	150%

\*Based on Senate and House of Rep.'s position as of October 21, 2014

# Summary

- Companies can use AIR's terrorism modeling solutions to estimate property and casualty losses resulting from a full range of potential terrorist attacks
- Best practices for managing terrorism risks using Touchstone should include:
  - Exposure management using Geospatial Analytics and Hazard Analytics Modules
  - Deterministic Modeled Loss Scenarios
  - Probabilistic Loss Analysis
- Terrorism is a highly dynamic peril; expert operational threat analysis ensures ongoing accuracy of model
- To ensure the continued protection of the commercial P/C insurance industry, TRIA must be extended beyond 2014



# Additional Reading on the AIR Website

## The AIR Model for Terrorism

More than a decade after 9/11, terrorism remains a highly dynamic threat capable of causing significant insurance losses. The AIR model takes a fully probabilistic approach to estimating property, workers' compensation, life, accident and health, and disability losses from possible future terrorist attacks in the U.S. The model supports pricing and underwriting decisions down to the individual policy level to assist companies in prudently managing their terrorism risk.

AIR WORLDWIDE

## The Geospatial Analytics Module in Touchstone

### HIGHLIGHTS

With Touchstone's visually rich and intuitive Geospatial Analytics Module, you can:

- Clearly understand and explain the drivers of risk (in terms of exposure, hazard, and loss) to internal and external stakeholders
- Account for financial terms when accumulating the risk
- Explore the impact of risk from non-modeled perils and regions
- Develop your own internal view of risk and facilitate regulatory compliance

More than ever before, companies are seeking powerful ways to visualize and understand their data to better manage risk. The award-winning Geospatial Analytics Module in Touchstone is the far more powerful than off-the-shelf GIS solutions. The module lets you seamlessly integrate exposure information, hazard, and probabilistically modeled losses to enable you to analyze risk in new, dynamic ways.

See where your global exposures are located and how they break down by construction, occupancy, year-built, and attribute. Visualize information such as landslide and liquefaction potential to formulate better underwriting and risk management strategies.

Accumulate exposures—again for non-modeled perils and take advantage of Touchstone's financial modeling, limits, and deductibles to calculate exposure-defined damage ratios to estimate losses.

In short, Touchstone's Geospatial Analytics Module goes far beyond the exceedance probability (EP) of your risk. A small selection of the dozens of possibilities presented here.



## The Hazard Analytics Module in Touchstone

### HIGHLIGHTS

With the Hazard Analytics Module, you can:

- Improve loss ratio
- Develop optimal insurance and reinsurance programs
- Set actuarially sound premiums
- Enter larger markets with competitive pricing
- Streamline underwriting workflow and increase productivity
- Identify areas for profitable growth or retraction

The Hazard Analytics Module in Touchstone identifies the catastrophic hazards to which the U.S. are exposed. Underwriters, managers, and mortgage lenders can use the module to analyze the impact of tropical cyclones, earthquakes, severe weather, and other hazards on their portfolios. The module uses hazard and loss data to determine the impact of hazards on their portfolios. The module uses hazard and loss data to determine the impact of hazards on their portfolios. The module uses hazard and loss data to determine the impact of hazards on their portfolios.

### LOSS METRICS AND TROPICAL CYCLONE SEVERE THUNDERSTORM LOSS AND RELATIVE RISK METRICS

100-YEAR LOSS LEVEL: equal or exceeded in 100-year return period loss level of 20-25% in given year that the loss replacement value.

Since after 9/11, terrorism risk insurance has become increasingly sought by other terrorism risks over the years. The federal government's action has been consistently trending on one of the top headlines in insurance industry news. Most recently, the House Financial Services Committee introduced legislation to extend the TRIA program for an additional five years. Earlier in June, the Senate Banking, Housing, and Urban Affairs Committee voted unanimously to move forward with their own bill to reauthorize the program for seven years.

So just why is the potential expansion or reauthorization of TRIA so necessary?

Included terrorism risk from standard commercial insurance policies. A threat to the broader economy loomed as a result as many projects were already put on hold, particularly within the construction and real estate sectors.

President George W. Bush signed TRIA into law in 2002 to create a federal reinsurance backstop that would allow for public and private sharing of losses resulting from future terrorist attacks. Intended to be only a temporary measure—providing time for the private market to stabilize and to ensure protection for consumers and the broader economy—it has been extended and extended twice to prevent it from expiring.

While the insurance industry has become increasingly willing to cover terrorism risks over the years, the federal government remains a critical component to the stability of the private insurance market and to the broader economy. There is still a long way to go before any bill to extend TRIA yet again could be enacted into law—leaving plenty of time for both the House and Senate to make revisions to their proposed legislation. But one thing seems clear: while there are significant differences between the House and Senate bills, both include a reduced federal role in the program.

AIR WORLDWIDE

## In Focus

### Terrorism Risk Insurance: TRIA Is in the House!

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# For More Information

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