



Cambridge Centre for Risk Studies
Advisory Board Research Showcase – 13 January 2016

TechCat Research Track 2015 Highlights

Centre for
Risk Studies



UNIVERSITY OF
CAMBRIDGE
Judge Business School

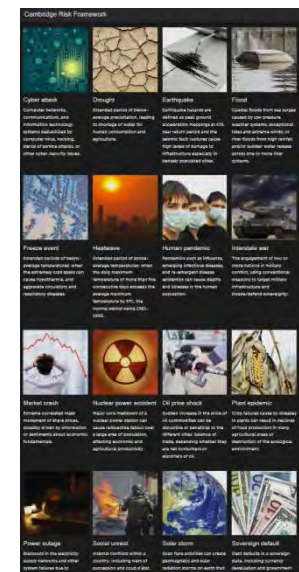
Simon Ruffle
Director of Research and Innovation

Engagement, Outreach and Collaboration

- Engagement (UK, EU, US)
 - Government (Cab Office, DECC, GCHQ, CPNI...)
 - Regulators (PRA, Lloyd's, OfGen, NERC...)
 - Industry (Insurance, Power...)
- Outreach
 - Risk Briefings
 - Conferences
 - Data standards
- Collaboration
 - Subject Matter Experts
 - Academia (ITRC...)
 - Consultants

Completed TechCat Research Projects 2015

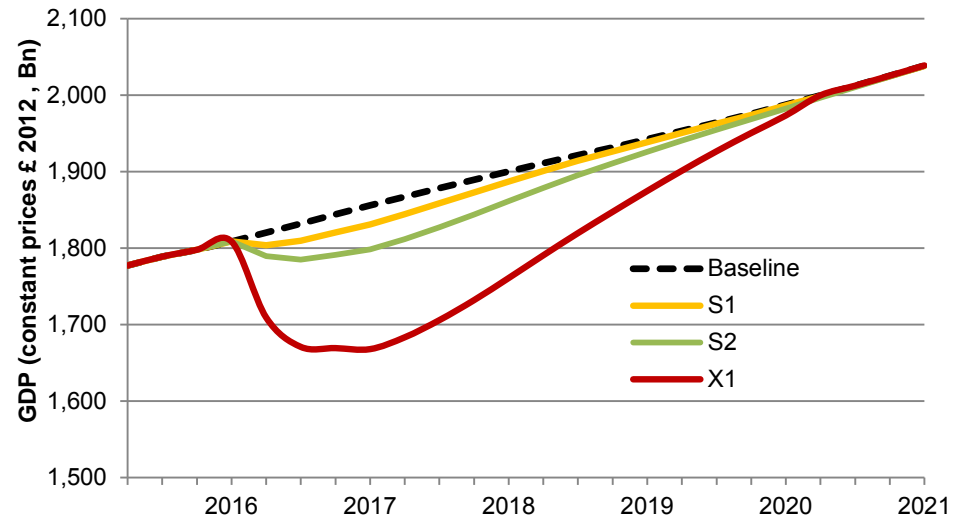
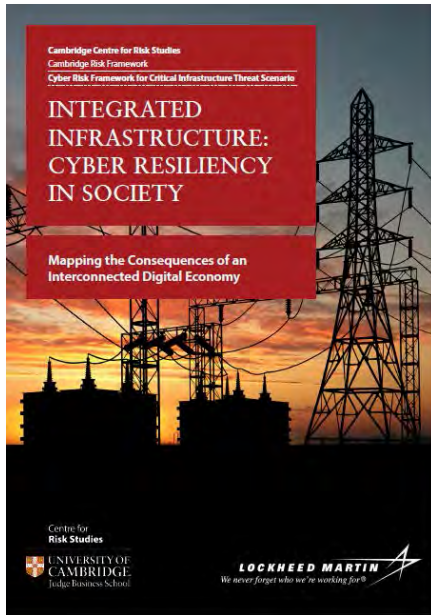
- Erebos US Business Blackout Scenario (Lloyd's)
- World Cities at Risk (Lloyd's)
 - Lloyd's Microsite
 - Cambridge Risk Framework Online Map Browser



Tech Cat Research Projects Completing in Q1 2016

- Integrated Infrastructure: Cyber Resiliency in Society (Lockheed Martin)
- Helios Solar Storm Scenario (AIG)
- Cyber Catastrophe Scenarios for Insurance Accumulation Management (RMS)
- Insurability of Cyber Catastrophe Risk – Assessment of PMLs (Talbot Underwriting)

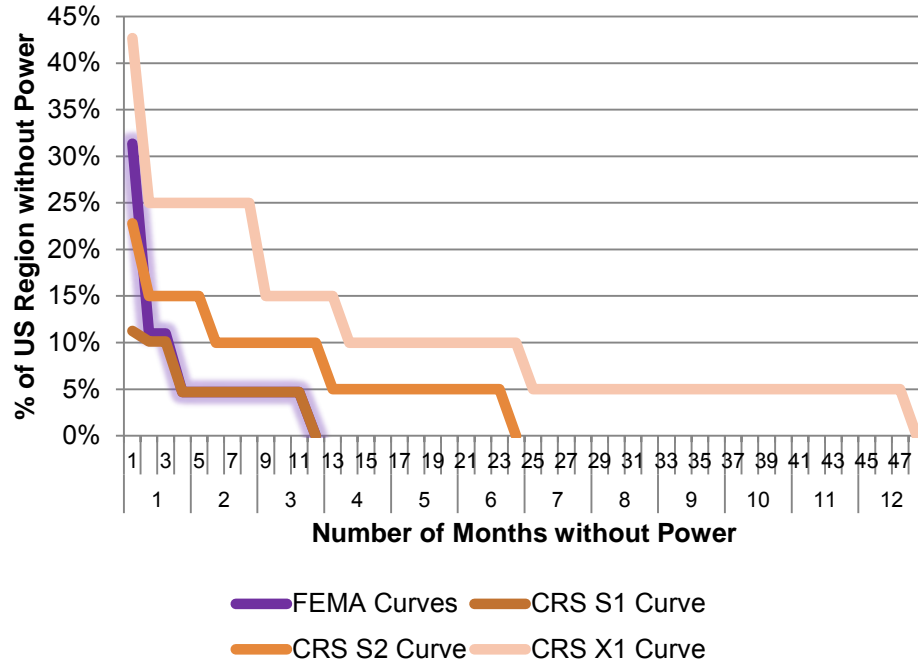
Integrated Infrastructure: Cyber Resiliency in Society



Domestic UK GDP@Risk under each scenario variant

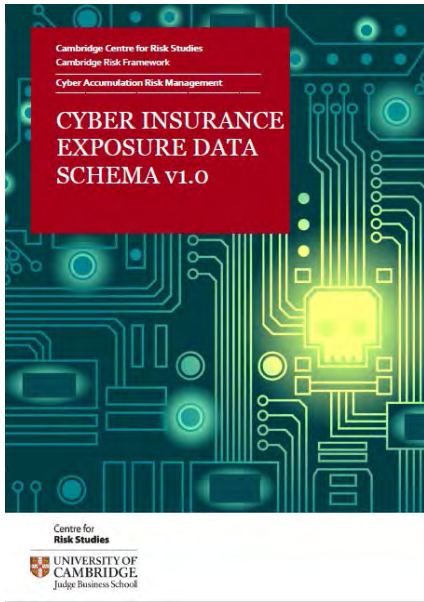
Scenario Variants	Lost power (TWh)	Company (1 year direct) Sector Losses £ billion	Customer (1 year indirect) Sector Losses £ billion	GDP@Risk (5 Yr) impact on overall UK economy £ billion
S1	10.3	7.2	4.4	49
S2	19.8	18.0	10.9	129
X1	39.6	53.6	31.8	442

Helios Solar Storm Scenario

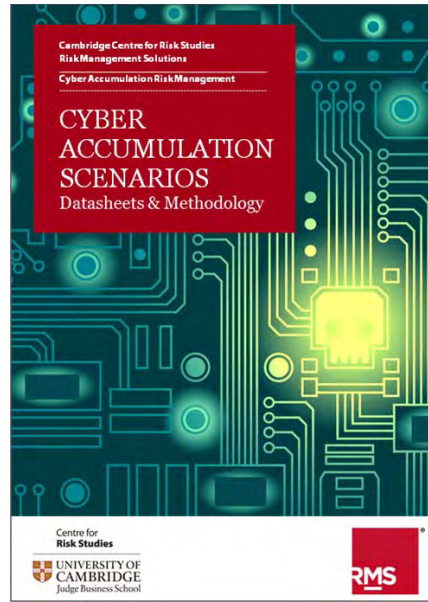


Scenario Variants	Baseline Damage	5-year Global GDP@Risk, US\$ Tn (Preliminary)
S1	1% of transformers	0.7 (0.2%)
S2	2% of transformers	1.8 (0.4%)
X1	3% of transformers	5.1 (1.3%)

Cyber Catastrophe Scenarios for Insurance Accumulation Risk Management



**Exposure Data Schema:
Proposed Industry
Standard**



Scenarios and models



Leakomania



Cloud Compromise



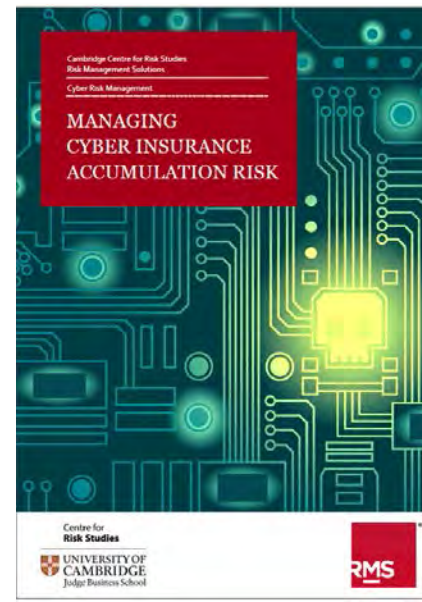
Mass DDOS



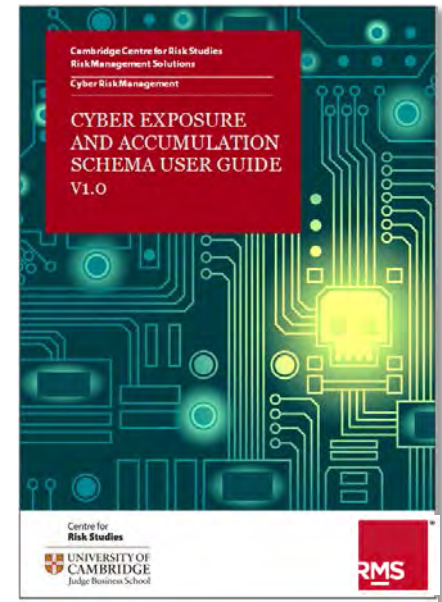
Financial Theft



Extortion Spree



**Thought leadership on
cyber accumulation for
insurers**



**User Guide for
Scenarios and SQL
Scripts**

Insurability of Cyber Catastrophe Risk – Assessment of PMLs



Aviation: Commercial passenger aircrafts

Spoofting attack on aircraft navigation systems



Facultative/Energy: Offshore oil platforms

Cyber-Induced Fires on Oil Rigs



Property: petrochemicals/natural gas/oil refineries

Phishing campaign leads to industrial control system attack












Property: Utilities

Industrial control system (ICS) attack on US electricity generation plants



Cambridge Scenarios: GDP@Risk

GDP@Risk US\$ Trillion		S1	S2	X1
	Geopolitical Conflict China-Japan Conflict	17	27	34
	Asset Bubble Shock Global Property Crash	13	20	33
	Pandemic Sao Paulo Virus	7	10	23
	Sovereign Default Shock Eurozone Meltdown	11	16	23
	Cyber Catastrophe: Information Technology Sybil Logic Bomb	5	7	15
	Social Unrest Millennial Uprising	2	5	8
	Solar Storm Helios	.7	1.8	5.1
	Cyber Catastrophe: Operational Technology Erebos US Blackout	.24	.54	1
	Cyber Catastrophe: Critical Infrastructure South East UK Blackout	.073	.19	.65







2016 TechCat Research Projects

New Projects for 2016







- Cyber Terrorism (Pool Re)
- Emerging Risk Scenarios (Munich Re)
- Marine Realistic Disaster Scenario (Lloyd's)
- Multiscale Infrastructure Transition Analytics (EPSRC)

12 Cyber Scenarios

OT

-  Erebos Business Blackout
-  South East UK CNI
-  Aviation Spoofing Cyber Attack
-  Cyber Induced Fires on Offshore Oil Rigs
-  Petrochemical Plants Phishing campaign leads to industrial control system attack
-  Industrial control system (ICS) attack on US electricity generation plants

IT

-  Sybil Logic Bomb
-  Leakomania
-  Cloud Compromise
-  Mass DDOS
-  Extortion Spree
-  Financial Transaction Interference

Discussion Topic

Prioritization of Components

C. TechCat Risk Research: Cyber

- a. Full Taxonomy of Cyber
 - Changes in the landscape
 - Future trends: internet of things; smart grids; smart cities
- b. Model of the Cyber Economy
 - Policy tool: government, regulators, corporates, insurers, tech companies, security consultants
 - Correlation landscape for catastrophe loss of cyber economy; metrics; data
- c. More scenarios
 - Sensitivity studies
 - Silent for insurers
 - Make old scenarios more useful
- d. Cyber Conference

Discussion Topic

Prioritization of Components

C. TechCat Risk Research: Critical National Infrastructure

- e. Resilience: Interaction between threats, different kinds of systems, hotspot analysis
- f. International Resilience Metrics
 - E.g. China vs Norway
 - What constitutes ‘critical’ internationally?
- g. Insurance Consequences of Infrastructure Failure
 - Insurance coverages impacted
 - Ts & Cs
 - Exposure
 - Portfolio Specific Loss

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