Workshop: Intersections Between Resilience and Risk

Water supply, Energy supply, Food supply, Natural resources, Transport and Critical Infrastructures
By David Arscott (Pyterra)

What does Resilience mean to you?:

(How do you define resilience?)

- The ability of an infrastructure network to continue delivering services despite part of it becoming incapacitated.
- The ability of an infrastructure network to respond to reasonable changes in demand.
- The ability of an infrastructure network to continue delivering services despite an indirect impact from another utility network.

All these – define at what level of operation is acceptable.

Key Resilience Research Challenges:

(List what you believe to be the key challenges)

- Mapping interdependencies between assets from different utility networks.
- Predicting trigger events in order to allow networks to respond to potential impacts.
- Establishing a payments mechanism which will support the totex costs of resilience.
- Measuring risk transfer between different utility networks where interdependencies are cultivated in order to enhance resilience.

Your Current Research Focus:

(Identify your areas of research that could be applied to building resilience into risk management)

- Means of optimising complex networks in real time.
- Predictive algorithms based on machine learning for flooding.
- Machine-to-machine real-time payments system based on smart contracts and distributed ledger technology.

What would good look like?

(Your view required here – with some context)

- A system which allows an asset within a utility network to call upon the services of ‘upstream’ assets within any utilities network to provide services which can mitigate a predicted risk.
- A system which allows ‘downstream’ assets to be warned of potential direct and indirect impacts.
- An automated payments system for the above.

EPSRC
Engineering and Physical Sciences Research Council

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Perceived Barriers?:

(Where do you perceive the barriers?)

- Siloed industries which have separate strategic planning functions.
- Adversity by industry to innovating at a high level and holistically – happier to focus on technology, eg how to better discover leaks.
- Government is unclear how to set out policy which cuts across industry and tries to establish more market-orientated solutions.
- Professions (e.g. civil engineering) are trying to catch up with digital technologies.

What are the consequences - Risks?:

(What happens if no progress is made - ie status quo?)

- The status quo can never be achieved because there are too many dynamics, e.g. climate change and population growth.
- Otherwise the problems become unmanageable.
- If operational risks are perceived to be accelerating, regulators will have difficulty in setting sensible consumer pricing parameters and investors will either increase the expected return or exit all together.

Envisaged Breakthroughs Required:

(Where do you envisage big/significant breakthroughs?

- The ability for local government to have a greater say in the risks its community is will to take.
- The ability of local utility providers to develop smart communications networks (e.g. IoT based) which can drive the response of local assets in times of risk based on smart contracts between assets
- These technologies can then be used to support automated payments.

Who needs to do what?:

(Think here - what would you need and what would you do?)

- Focus on the language and functionality needed within smart contracts in order to support the above.
- We would establish a physical demonstration network based at a UK university using smart nodes, which could be used to explore and test their interaction when faced with risk events.