

The following presentation was given at:

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**“Cost Benefit Analysis: What is the Benefit”**

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# Economic Value Chains

SCAF Conference  
“Cost Benefit Analysis: What is the  
Benefit?”

11th September 2018

QINETIQ/EMEA/PAS/PUB18-00029

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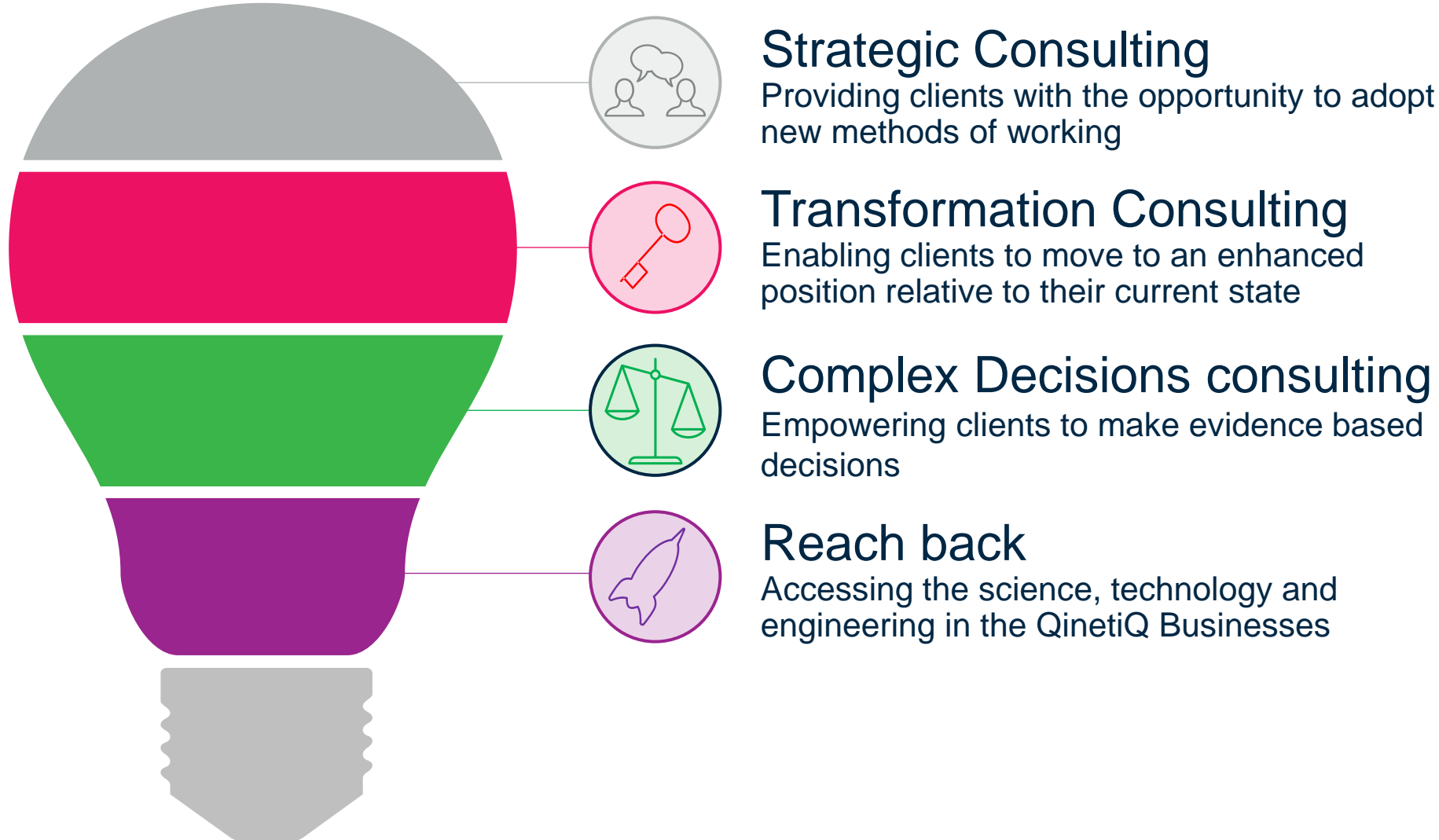
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# 1. The presenters – QinetiQ Advisory Services



## 2. Introduction

## 2. Introduction

- Economic Value Chains (EVC) is an approach to determine the cost consequences of an event in a context - the “so what”.
- The event may be:
  - Planned, e.g. refurbishment of a facility
  - Unplanned but deliberate, e.g. a cyber attack
  - Unplanned and not deliberate, e.g. a fire or flood
- Context is necessary: The Wannacry attack on the NHS was on a Friday. The weekend reduced the effect and a Monday attack would have been far more serious.
- By assessing the consequences of an event before intervention, and again post intervention, the cost benefit of that intervention can be calculated.
- Interventions may include:
  - Introducing cyber defences and reversionary modes;
  - Removing reversionary modes;
  - Changes to the environment, use of the system, or threat capabilities.

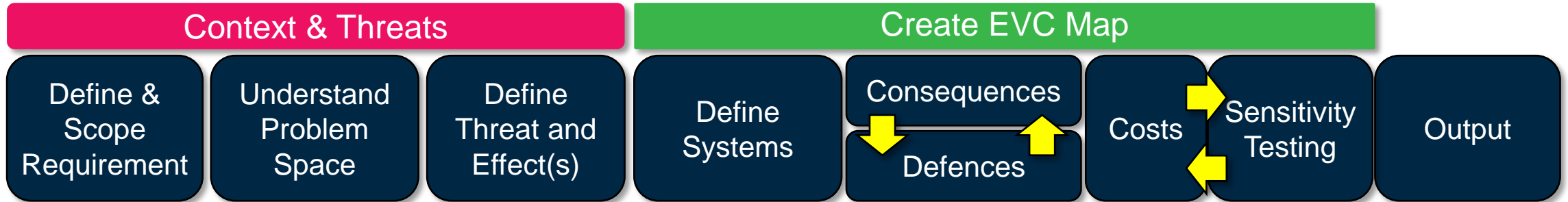
## 3. EVC Technique



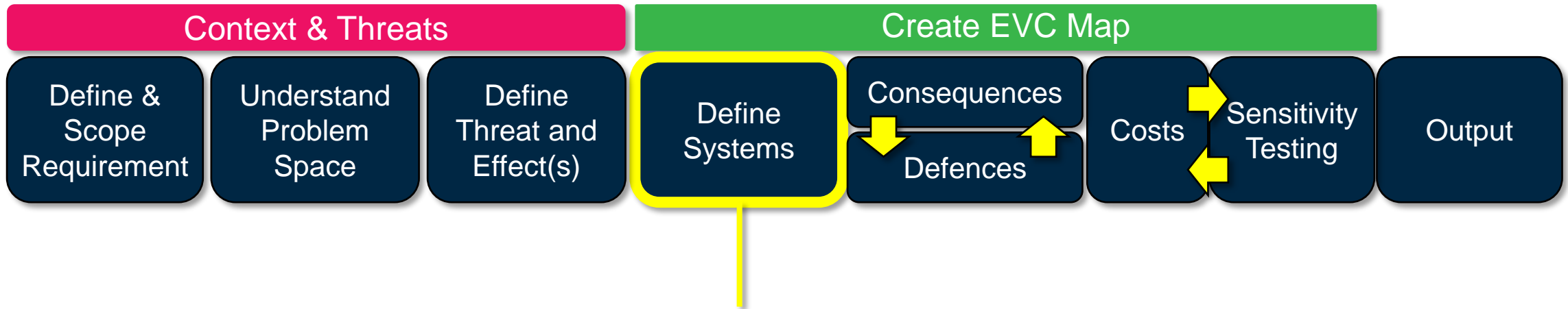
### 3. EVC Technique

- An EVC is a modular diagram used to identify and quantify the impacts of the exploitation of a vulnerability in a context.
- The EVC technique uses the process of constructing the EVC diagram, the diagram structure, and quantified inputs to produce the output.

### 3. EVC Technique

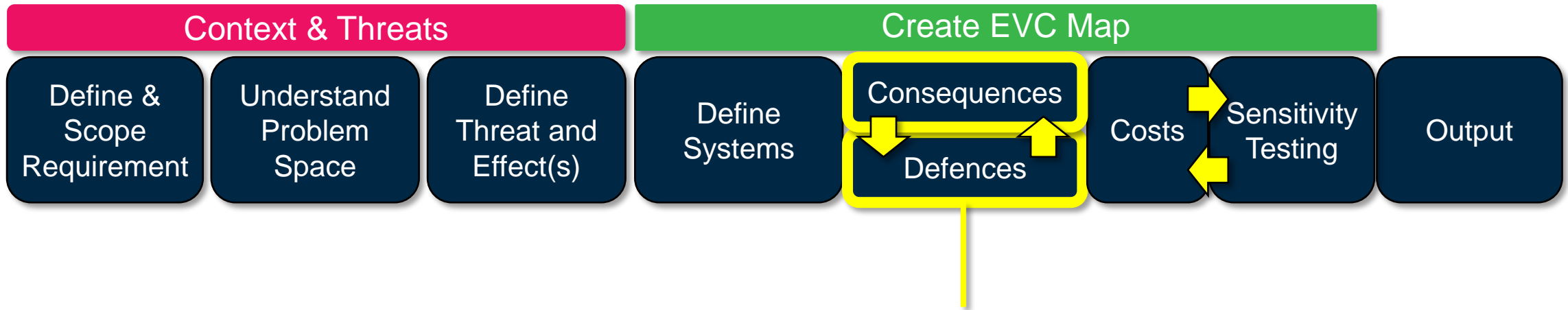


### 3. EVC Technique



- What aspects of the business could be affected by the threat?
- What do the systems do?
- What are the system dependencies (power, cooling, access control)?
- What are the system interfaces (communications, links to other systems)?

### 3. EVC Technique

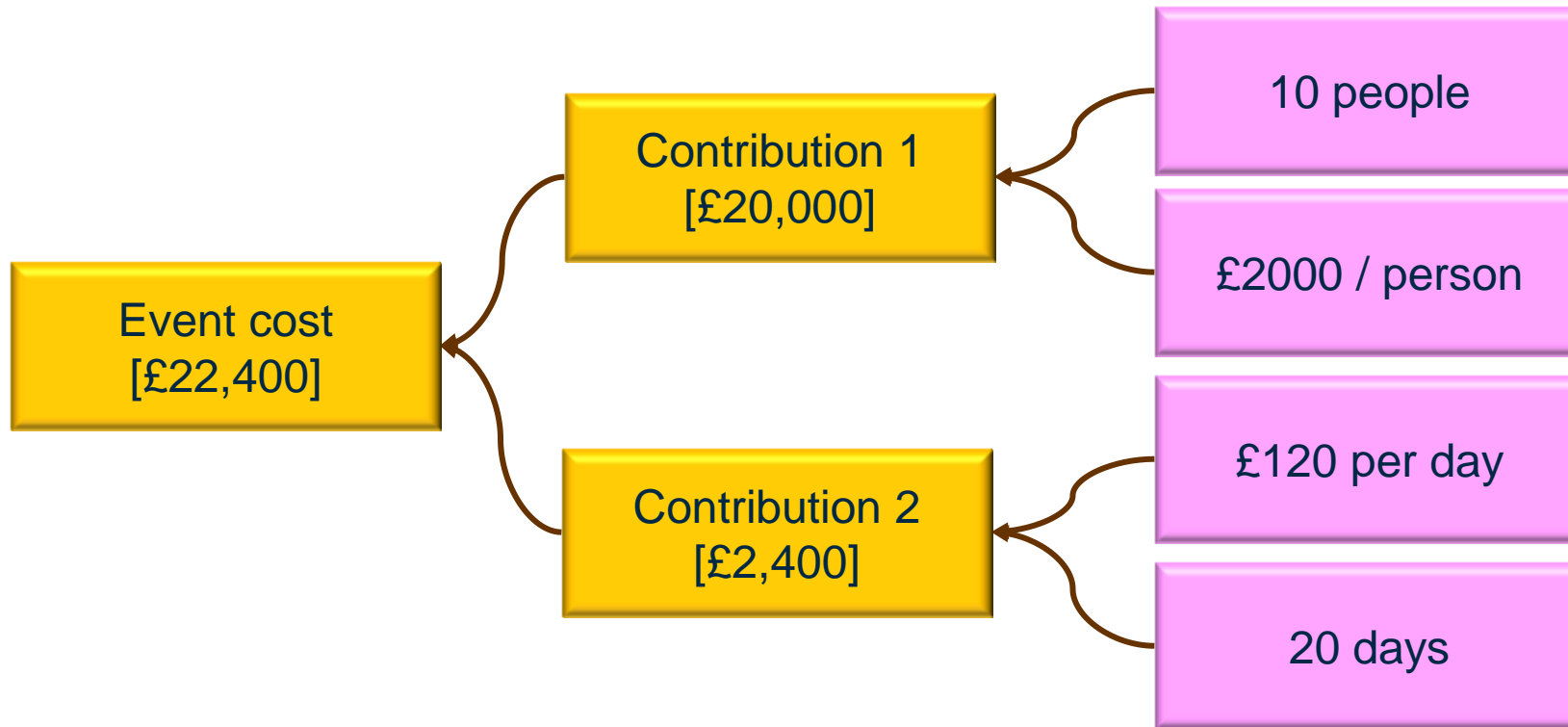


- How could the business be impacted if the system is affected?
- How would the issue be rectified / damage undone?
- How would the event be identified?
- What mitigation measures are already in place that may limit the cost/impact?

### 3. EVC Technique – the map

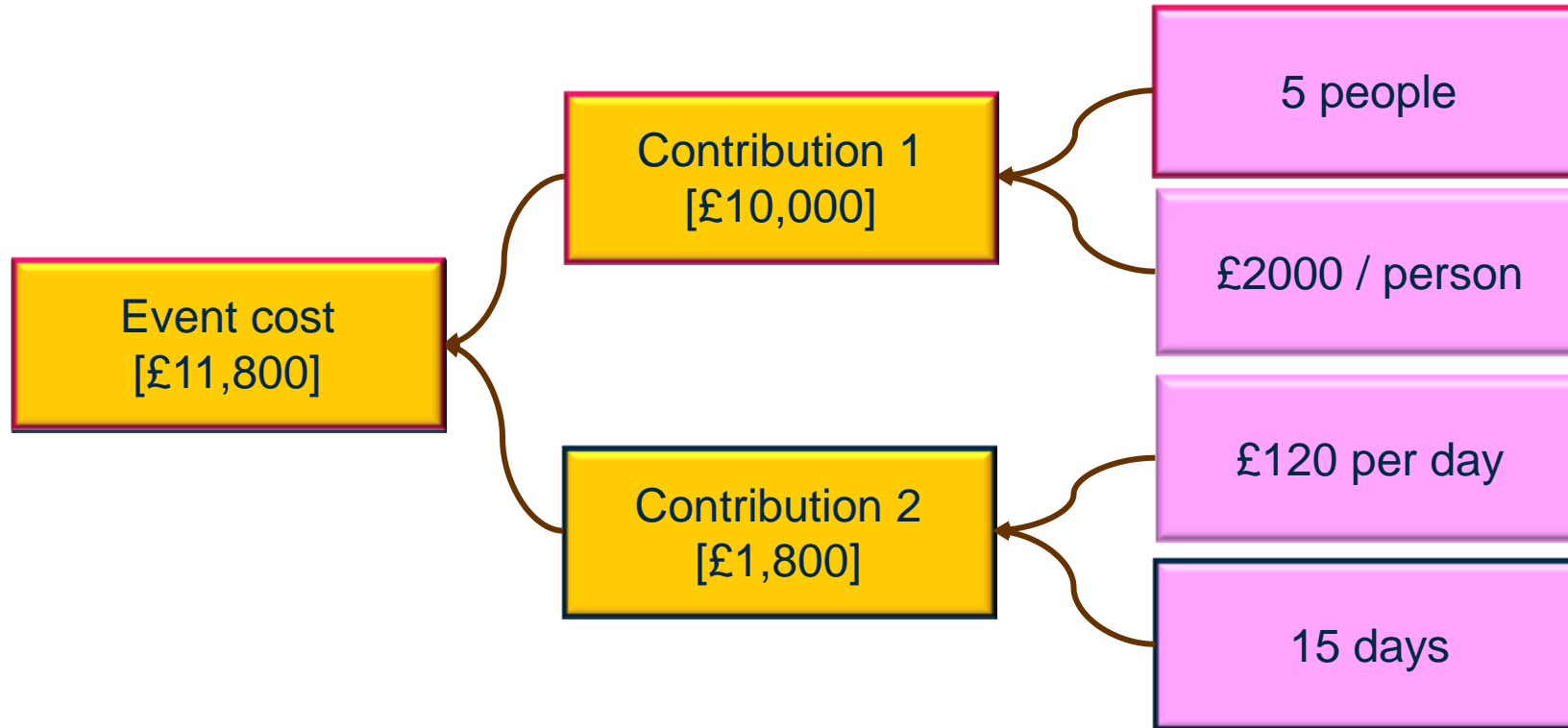
Input values are entered on the right of the diagram and aggregated through the EVC to give the event cost on the left.

Each node has a specific formula for combining inputs, defined in the diagram.



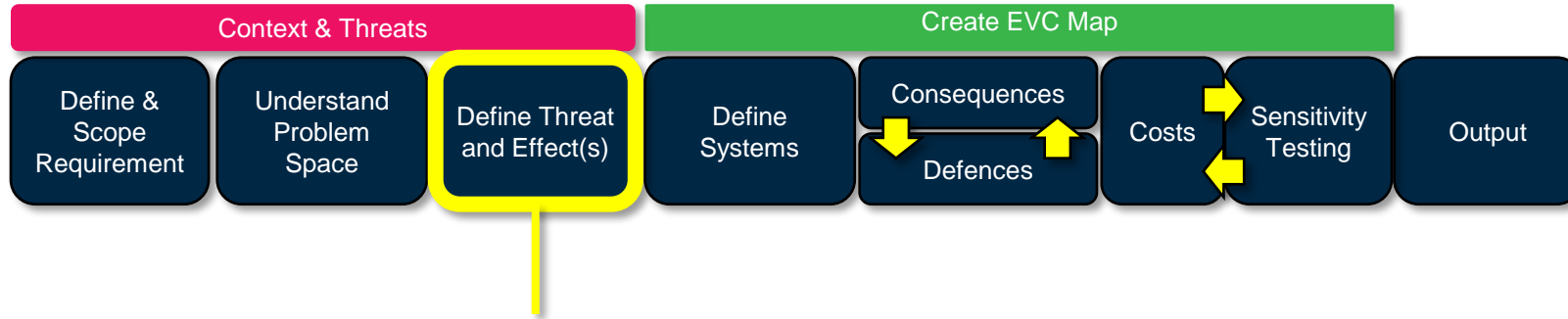
### 3. EVC Technique – the map

The benefit (or dis-benefit) of interventions can be calculated through appropriate changes in inputs



## 4. Explained with a worked example....

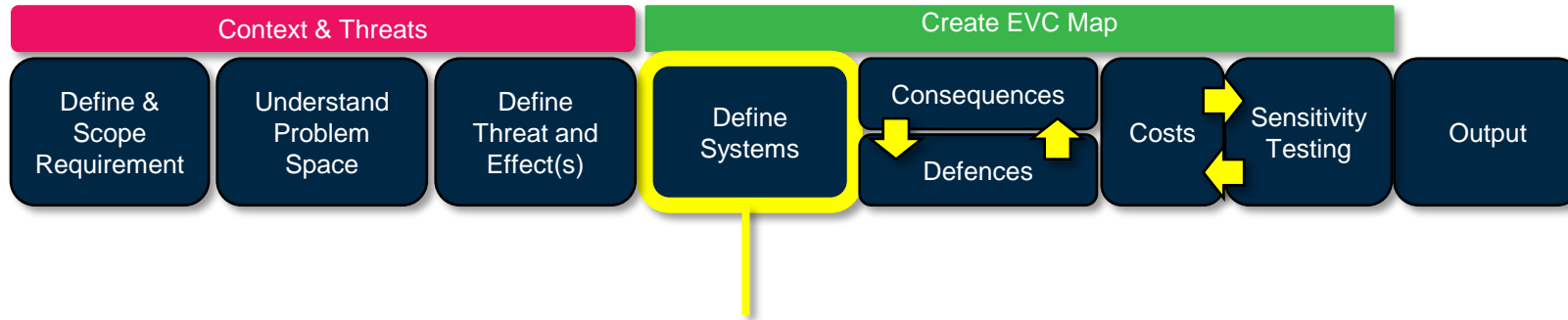
## 4. Explained with a worked example...



- Threat source: Hostile individuals with a grudge against an airline.
- Threat actors:
  - Ground crew,
  - Air crew,
  - Developers,
  - Maintainers,
  - Passengers,
  - A combination of the above.
- Objective: cause reputational or economic damage to the airline.

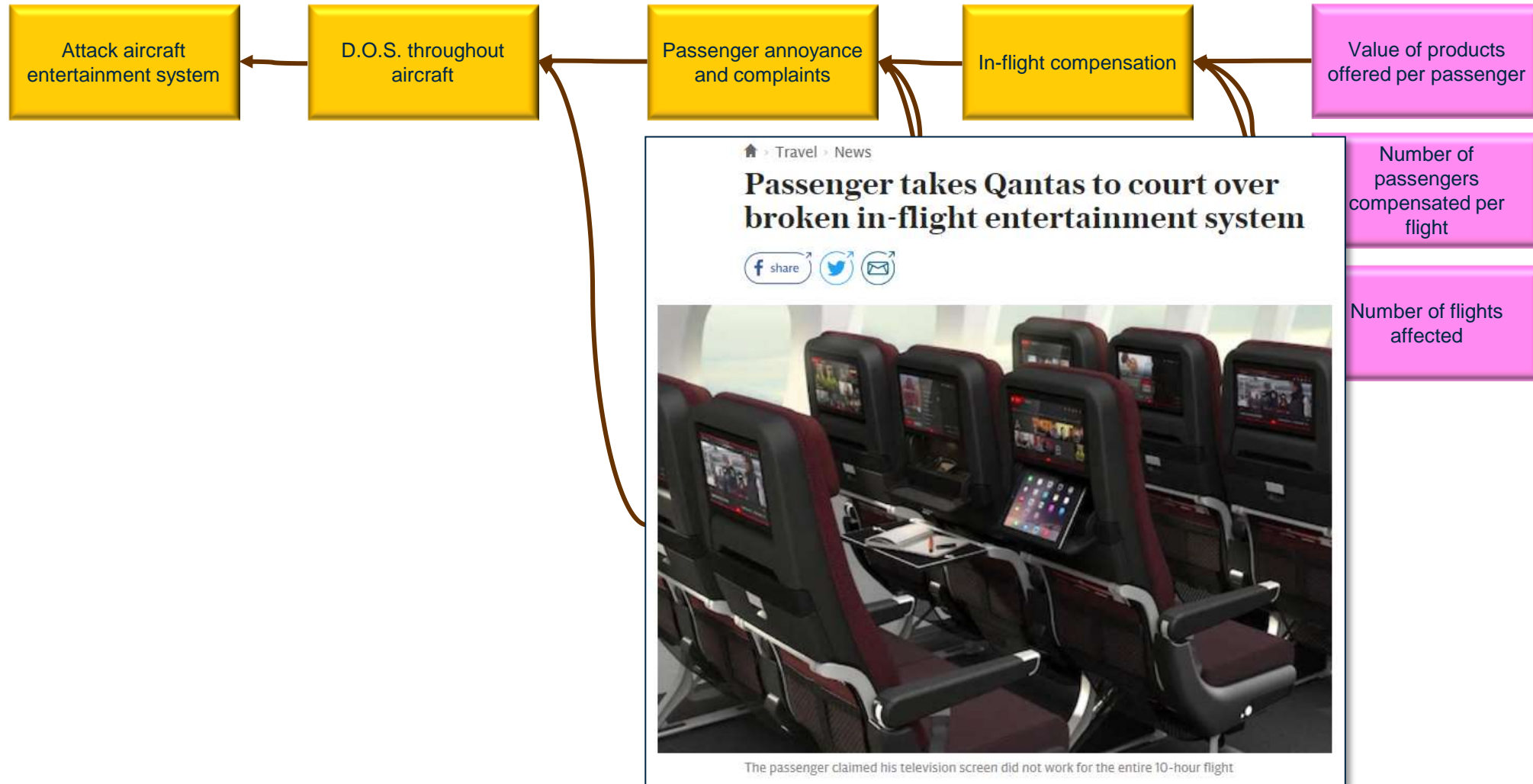


## 4. Explained with a worked example...

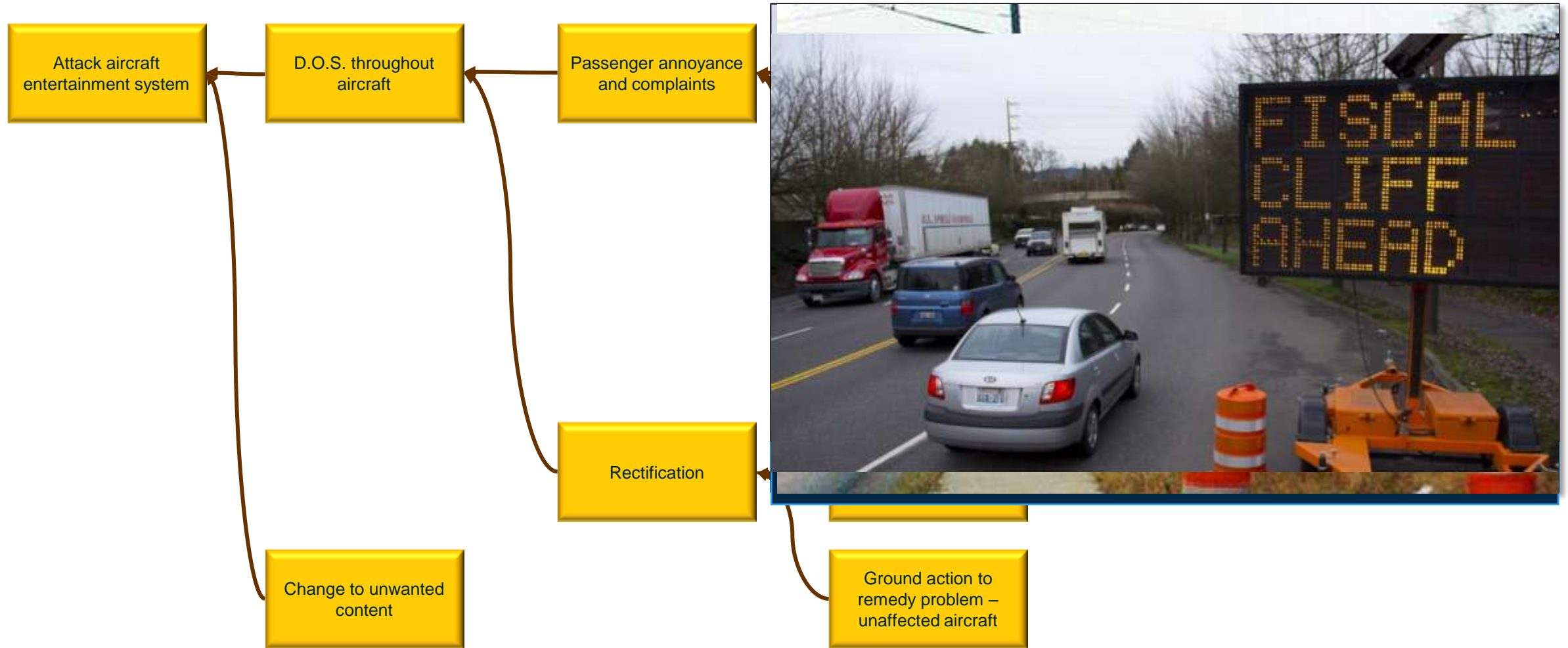


- What aspects of the business could be affected by the threat? – Ticketing, billing, maintenance... **in flight entertainment systems**
- What do the systems do? Entertain passengers, revenue from premium content, reduces passenger disruption, improves passenger satisfaction, meets passenger expectations.
- What are the system dependencies? The aircraft, content uploads, billing downloads.
- What are the system interfaces? Satcom, navigation feed, content import, passenger USB port.

## 4. Explained with a worked example...



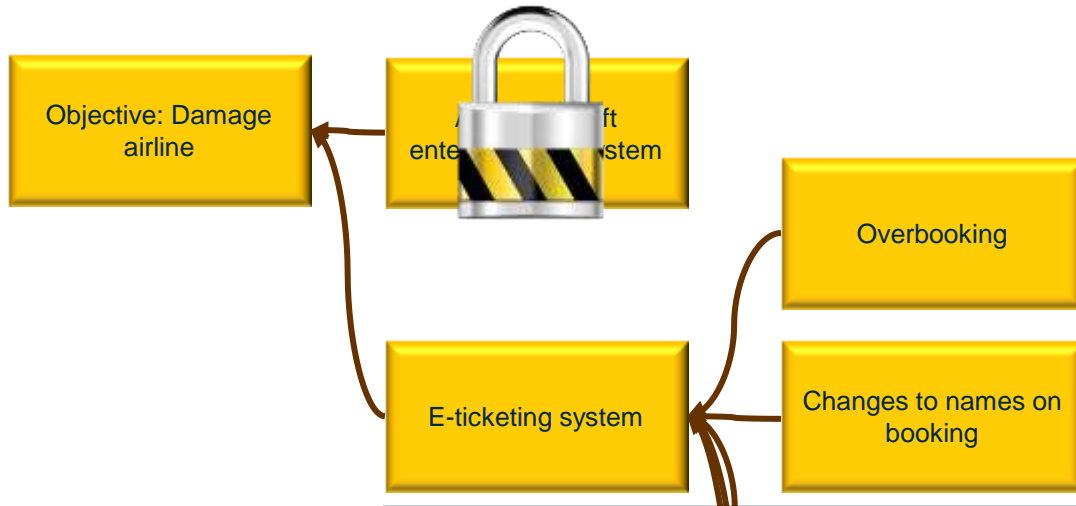
## 4. Explained with a worked example...



## 5. Explained with a worked example.... Audience participation

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## 5. Explained with a worked example... Displacement of threat interest



- Allows exploration of whether the anticipated benefit can actually be realised.
- Avoids spend on easy-to-implement changes that will not provide the benefits required.

### BA boss apologises for data breach

The airline says it will compensate customers affected financially by their personal details being compromised.

🕒 14m | Business

- How did hackers get into British Airways?
- ▶ BA boss promises compensation



## 6. Summary

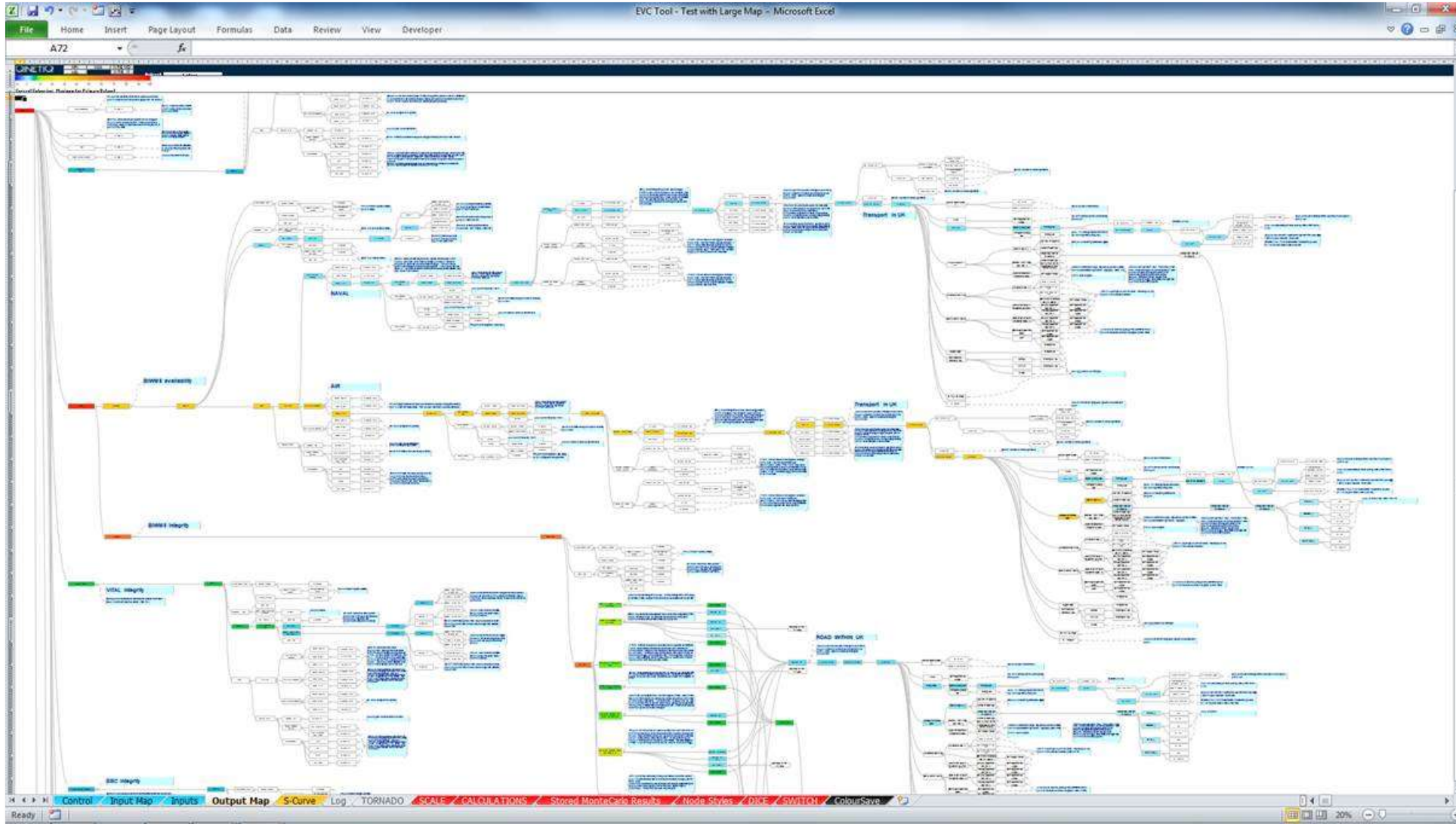
## 6. Summary

- The process of constructing the diagram is a key part of the technique.
- Decomposition allows the effect to be broken down to a level where estimates of cost can be made.
- Further decomposition can be added to the EVC simply by adding nodes to the diagram.
- The 'model' is exceptionally transparent, allowing review and validation by SMEs not familiar with modelling.
  
- The technique is focussed on differences – differences in action or capability – anything that is not changed may be noted but excluded.
  - EVC is not trying to produce a comprehensive cost for before an event, and another after the event – it costs only what the event changes.
  - This significantly reduces the amount of data that needs to be collected.



# 7. Case Study

# 7. Case Study



actions with

## 8. Benefits of EVC

# Benefits of EVC

- Clearly identifies problem areas
  - Node colouring allows quick and visual identification of cost drivers
  - Uncertainty analysis highlights where further research is required
- Saves time and effort
  - Parts of diagrams can be re-used from one EVC to another
  - Costing only required for cost delta – no knowledge of unchanging costs is required
  - Inherent validation and audit trail
- Simplicity of presentation
  - Cost, consequence and uncertainty displayed on a single diagram
  - No complicated formulae to trace or explain – the diagram is the model
- Provides evidence for decision making
  - Quantify the cost effect of mitigation
  - Ordering and prioritisation of options and risks
  - Determining cost and benefit of action vs the cost of inaction

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