Anti-Innovation: using insights from Design Against Crime to frustrate terrorist creativity

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DESIGN AGAINST CRIME

DaC

Creativity, Innovation and Terrorism

The concern is not so much for the current capability of the fast-growing countries, but rather for the pace and scale with which they are building their high-tech industries, their scientific base, their research capabilities and most of all, their skills base and educational facilities.

Cox Review of Creativity in Business (2005)

Echoes within Terrorism?

Two strategies to apply design knowledge to CT

Racing
Designers and others out-innovate terrorists in producing, deploying and operating anti-terrorist interventions

Thwarting
Designers and others apply 'anti-design' and 'anti-entrepreneurialism' to block terrorist innovation

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How to proceed

First we must understand what we mean by design, creativity and innovation

Using Cox Review

Then map our understanding of the generic design and innovation process onto the terrorist counterpart

Then, using knowledge of how to facilitate these processes, find ways to block them considering

- Design in general
- Design Against Crime in particular

No answers today!

Instead, suggesting questions to ask, and ways of thinking, that can facilitate generation of solutions

But those solutions must be carefuly-designed themselves

Discriminating:
Mess up terrorist innovation *without* messing it up for honest innovation, which we badly need as climate changes, resources shrink…

Plausible:

A good chance of working rather than blowing up or blowing back in our faces

Realistic:
Fit for world where almost all knowledge, including knowledge of how to design and innovate, is shared, and trade is global

What's coming up

- Ground clearing – key concepts

- Input – resources to be creative with

- The Process of creativity and innovation

- The Products of creativity and innovation

Ground Clearance

Creativity

The generation of new ideas

- Either new ways of looking at existing problems
- Or of seeing new opportunities
- Perhaps by exploiting emerging technologies or changes in markets

Quality of ideas

- Plausible a priori, not random generation of variety
- Serviceable
- Sometimes fiendishly cunning
  - Unexpected
  - Anticipate constraints and countermoves
  - Manipulative
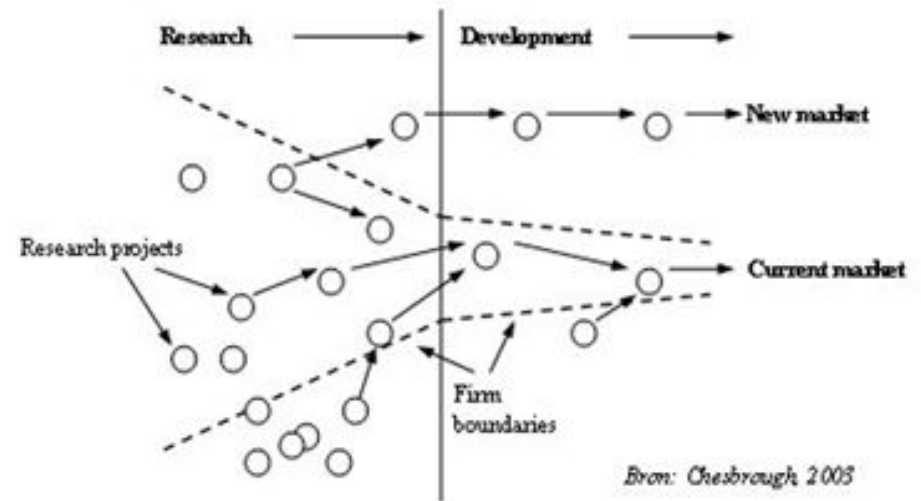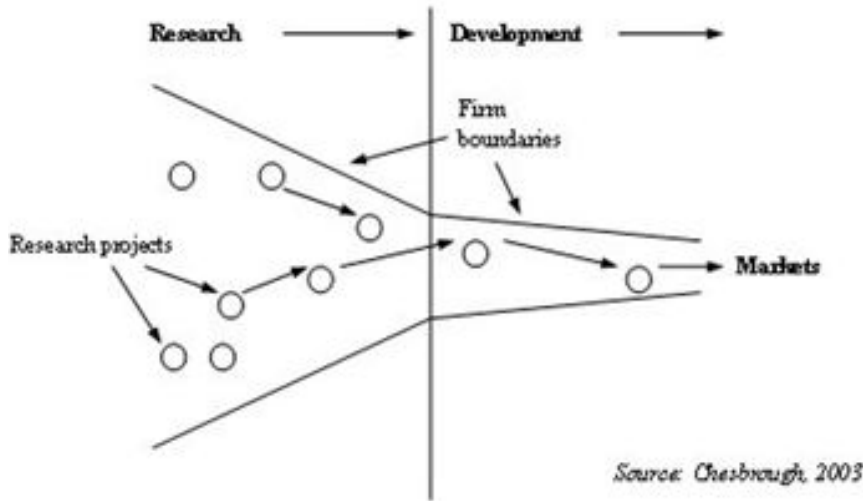
Ground Clearance

Innovation

The successful exploitation of new ideas

The process that carries them through to new **products**, new **services**, new ways of **running the business** or even new ways of **doing business**

Closed and Open Innovation

Chesbrough 2003

Open innovation is beneficial for business

How does open innovation facilitate terrorist innovation?

How can we boost **benevolent** open innovation whilst bashing **malevolent** open innovation?

Ground Clearance

Design

Links creativity and innovation

Shapes ideas to become practical and attractive propositions for users or customers

Creativity deployed to a specific end

Ingenuity

Finding solutions which thread between many complex and conflicting requirements

A matter of Capacities

Whether we are racing or thwarting terrorists it's useful to make these distinctions, adapted from **legitimate** design

Operations

Innovation

Operational capacity

By **terrorists**

Innovative capacity

How can we…

Deploy	Disrupt
Build	Dismantle
Develop	Stunt

Capacities realised via Resources – the raw material inputs of terrorist innovation

From CT POV products, places, services, systems, events can be

- **Misappropriated by terrorists**
- **Mistreated**
- **Mishandled**
- **Misbegotten**
- **Misused**
- **Misbehaved with**

As individual items, but more usually in combination –connection between creativity & Remote Association

(cottage, cake, blue =?)

(phone, sensor, detonator =?)

Opportunity taking and opportunity making

Consider easy opportunities, difficult opportunities and those which are conjured out of thin air or from a noisy background by sheer effort and talent…

Latter might involve several **steps**, the **understanding** of how things work, the **inspiration** of making remote connections, the **ingenuity** of solutions, the **entrepreneurial** flair, the **perspiration** of intense planning and iterative **improvements**
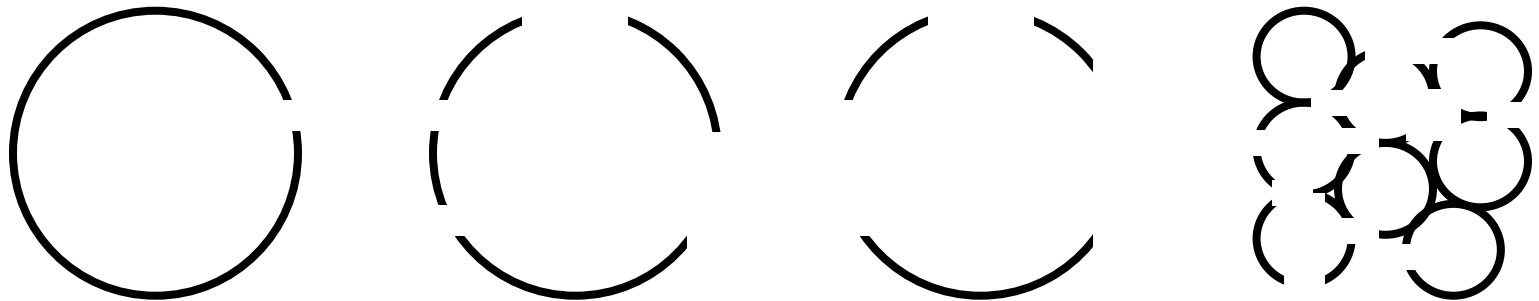
- In key fields, can we make the challenge to terrorist creativity more like the **right** than the **left** extreme?
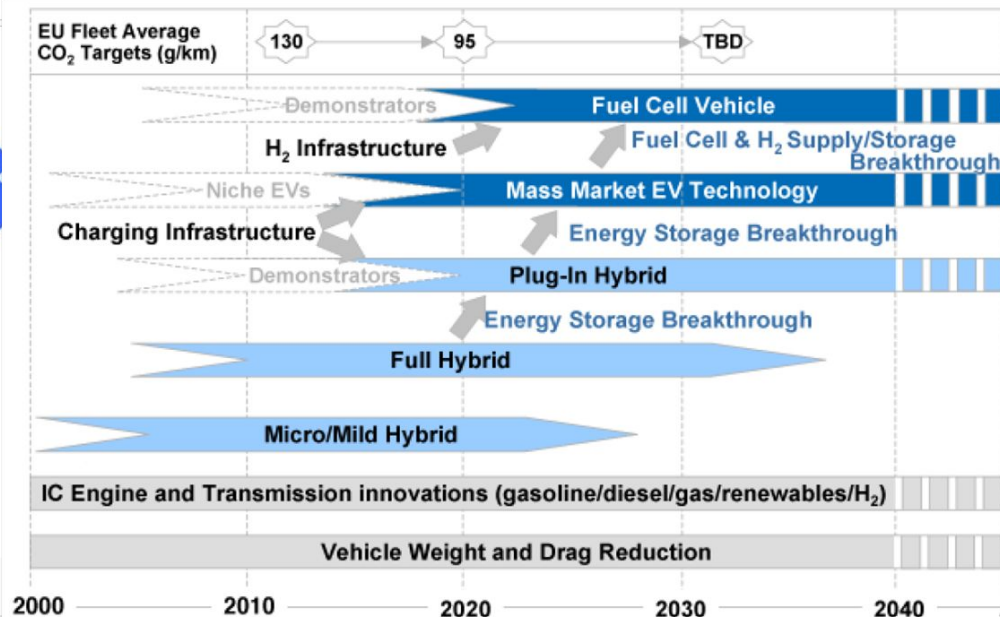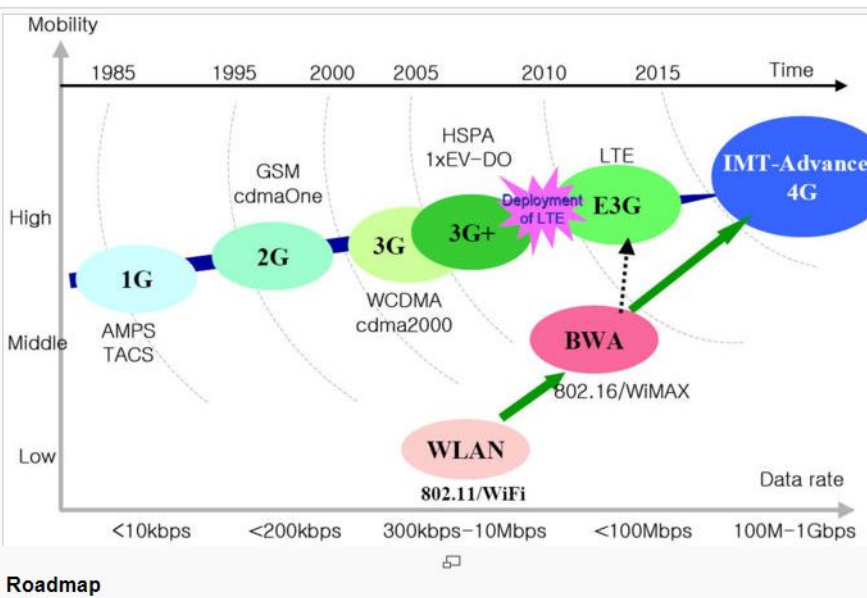- But – genies & bottles - does this leave us better/worse off?

Resources anticipated - technology roadmapping

- ## Retrospective
  - e.g. Everything that had to come together to make mobile phones possible
  - The Empire State Building possible
  - Twin Towers...... (easy to fly aircraft, simulators...)

- ## Prospective
  - What's coming together to make what possible by way of terrorism… & C-T?

Roadmap

How can CT use tech roadmapping?

- To spot resource-driven opportunities that may be coming together for terrorists
- To try and divert or control these opportunities – at least to identify the crucial ones to look out for and influence
  - Bird flu studies with ferrets – 'only 5 mutations away from direct human-to-human infection'
  - But note the argument over the attempts to control scientific information for replicating research method, in scientific journals

Design – product or process?

Is design what we make, how we make it, or both?

Crime prevention practitioners often focus on former, to their and our cost

Replication and the importance of process knowledge –

- Many crime prevention practitioners like to copy 'success stories' – but they do this too literally and too rigidly

- Research shows that 'cookbook copying' doesn't work

- So we argue that they should throw away the cookbook!
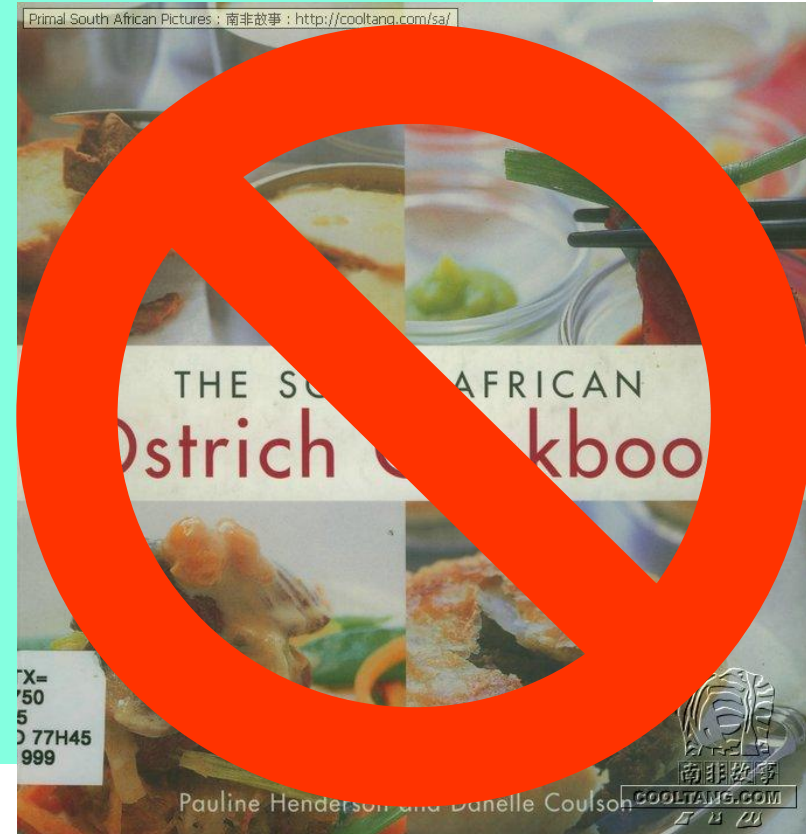
Throwing away the cookbook

Our experience of crime prevention suggests that practitioners, and designers, should

- Be adaptable, subtle, alert to tradeoffs e.g. between security and convenience or aesthetics
- Be aware that every replication of a 'success story' must be customised to a new context – hence every replication involves improvisation and innovation
- Be innovative, capable of creating plausible proposals for new circumstances and new problems
- Be able to handle uncertainty and a lack of complete knowledge of what works against crime – use a blend of evidence, experience, and theory-based first principles
- Anticipate & allow for change – out-innovate offenders
- **Terrorist practitioners need to do likewise** – except aesthetics…

(How) does replication issue apply to terrorists?

- ## One-off spectaculars,
  - E.G. 9/11, with 'silver bullet' methods that can only be used once, never replicated…
  - But only because of massive effort on part of security
  - Re-framing – is the 'effect' the terrorists want, the spectacular, the tie-down or both?

- ## 'Regulars' such as IEDs
  - When these are implemented in yet another dusty culvert, how innovative do replications have to be?
  - But presumably they have a set of generative principles, tradeoffs, scripts etc that can make for plausible improv –
  - How do they develop & transfer this knowledge? What inhibits knowledge transfer? *That's another seminar!*

- ## Which of these are 'better' for us to control/endure?
  - Should we be try to 'shape' evolution of terrorist techs?

Double-Diamond model of design process (Design Council)

How far can we apply it to CTC?

Discover **Define** **Develop** **Deliver**
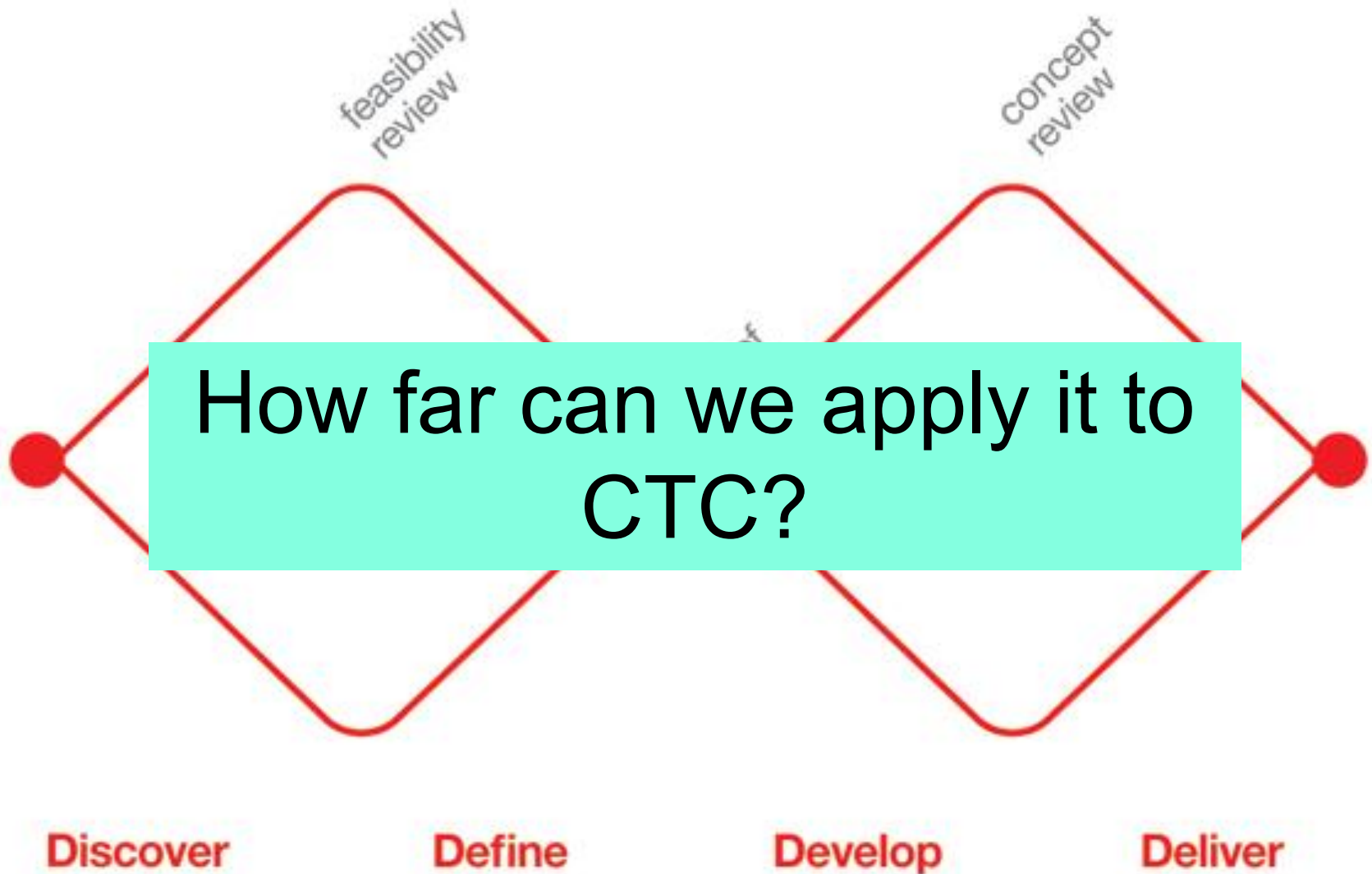
Double Diamond – a closer look

Discover – initial idea or inspiration where user needs identified

- – Market research
- – User research
- – Managing information
- – Design research groups

Define – interpretation and alignment of needs to business objectives

- – Project development
- – Initial ideas
- – Project management
- – Project sign-off to proceed with design work and business plan

Develop – design-led solutions developed, iterated, tested within company

- – Multi-disciplinary working
- – Visual management
- – Development methods
- – Testing

Deliver – resulting product or service is finalised and launched in relevant market

- – Final testing, approval and launch
- – Targets, evaluation and feedback loops

Discover – worked example

Initial idea

- Market research
  - Tracking perceptions/ attitudes to the company, its products/ services, brand, customer satisfaction [company = terror group]
  - Competitor analysis [rival terror groups? CT forces?]
  - Feedback on performance and reception [by various terrorist audiences – targets, supporters]
  - Anticipate future user or consumer needs [e.g. when police get better at phone tracking/tapping]
  - Gaps in market [Terrorist strategy, tactics; CT weaknesses]

- User research
  - How users accessing current products & services [who are users – the field operatives of terror group?]
  - Areas for improvements or innovation [ok]
  - Opportunities for new products & services that will address a user need [Research into needs of bomb deliverers etc]

- Managing information
  - … [will need restriction on need-to-know, cell basis?]

Questions about utility of DD generic design process model for CTC

What is the 'product' of terrorism that is being designed/ innovated?

– An individual bomb?

– A replicable bomb design?

– An event e.g. attack/ explosion? – more like performance art or installation

– An identity or brand of an organisation? Communications design

– A complete campaign? Like advertising

– A climate of fear/ influence attempt? More like marketing

Innovation Performance: New Product Development

Cooper and Kleinschmidt 1987

- Main success factors in design development :
  - Systematic, well-executed development process
  - Well-executed front-end activities – understanding both constraints & requirements
  - Building in 'voice of the customer'
  - Having a well-defined product spec before moving to production
  - Using well resourced, cross-functional teams
  - Having a well planned, properly resourced launch onto market
- Which of these are relevant to terrorism?
  - Mental gymnastics e.g. 'Customer' – as art sponsor?
- How to reverse them?

The design challenge for terrorists

- Terrorism may range from easy opportunity/ low-performance design to narrow opportunity/ high-performance design e.g….
  - Concealability of bomb and bomb-factory, preparations for attack
  - Portability
  - Reliability
  - User-friendliness [!]
  - Easily obtained materials?
  - Materials not traceable after event [?]

- How can we understand design challenge generically, to help us raise the bar?

Boosting inventiveness to cut crime whilst respecting the tradeoffs

TRIZ – a theory of inventive principles

- Based on analysis of **oodles** of patents

- 40 generic **Inventive Principles**

- 39 **Contradiction Principles** – e.g. strength vs weight, power vs energy-saving

- **Lookup tables** – what inventive principles solved what contradictions in the past?

- Analysis of **evolutionary trends** of invention – look for what's likely to be next, to limit search for next solution

From process to product:

Defining solutions

**_Ideal final result_
(from TRIZ)**

IFR example: preventing theft of bikes from student housing

An indoor bike parking arrangement which is simultaneously user-friendly and abuser-unfriendly:

- Economical
- Easy to manufacture/install/maintain
- Aesthetic
- Effective at supporting bike
- Convenient and clean for all inhabitants/other users
- Easy for user to employ
- **At reduced risk of abuser stealing bike**
- **At reduced risk of** user, **abuser** or others **damaging bike and/or fittings and building** in course of theft

Fundamental strategy to meet theft prevention requirement

- Both legitimate owner/user and thief/abuser want **possession and/or use** of the bike

- Maybe also want **entry to building** where bike kept

- Designers' task is to **discriminate between them without interfering with the rest of the design requirements that serve users**

- This leads us onto **contradiction**

Contradiction

- The **TRIZ** approach suggests that the **more sharply-expressed the contradictions** in the design requirement, **the clearer the design task** in seeking to resolve them

- The fundamental theft prevention requirement of **discrimination** between user and abuser is such a contradiction…

- As are the **Tradeoffs** between crime prevention and other requirements – privacy, economic and intellectual freedom, aesthetics etc

- **Terrorists** have to address contradicting requirements too

Ideal Final Result … for terrorists

Can base IFR on **effects** that terrorists want to achieve/avoid

- **Operational level e.g.** (could do also for capacity building
  - Successfully **recce** likely targets
  - Select **appropriate target**
  - Carry out **preparations**
  - Execute **attack**
  - ? **Get away**
  - In such a way as to deliver the message/exert the influence on various stakeholder groups
  - **Without** waste of resources/time/effort
  - **Without** getting stopped/caught/traced
  - **Without** betrayal by associates
  - **Without** premature detonation etc
  - **Without** shooting themselves in foot propagandawise

- **This gives us a clear set of actions/opportunities to block**

- **The more the constraints, the more demanding of high performance designs/ creativity, & the fewer Terrorists are up to it**

Reverse TRIZ – deliberate approach to blocking?

Changes the basic question from 'what went wrong?' with a product or system (e.g. vulnerable to terrorist attack), a checklist type of approach, to 'how do I *make* it go wrong?'

- Conducive to a more active, 'saboteurial' analysis

- Could be used in

    – Red-teaming to anticipate the terrorists' moves/designs

   – Trying to mess up the terrorists' own creativity

TRIZ – evolution

- Analysis of **evolutionary trends** of invention

    - E.g. **bearings** – solid > hollow > multiple hollows > porous > porous with active elements
    - For any product, look for which parameters are lagging in their particular trend, to limit search for next solution

- **Next terrorist techniques** e.g. for trigger of IED

    - Estimate how far off/ how many 'mutations' needed for successful development of new product or modification

    - Watch out for availability of necessary resources

    - Control those resources
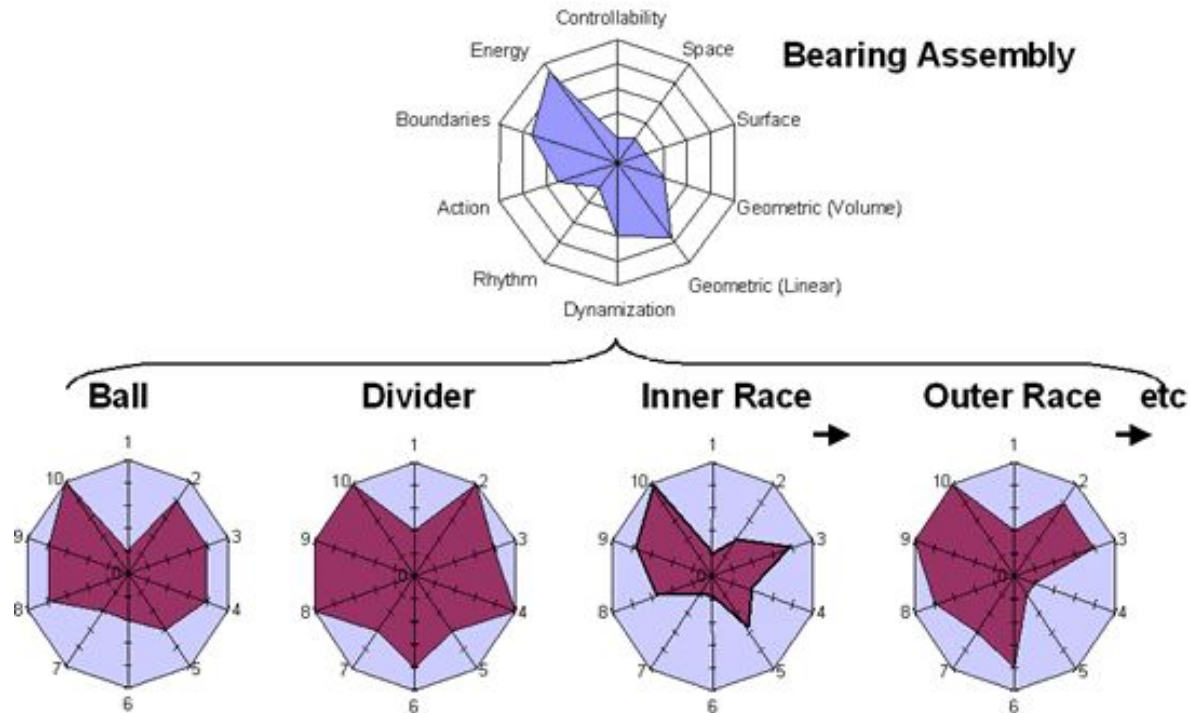
Gearing up against crime:
A dynamic strategy for arms races

- Encourage variety
- Discourage variety of terrorist solutions
- Design to performance standards/ generic principles
- Get terrorists trapped within1-off designs
- Study offender resources – current and future
- Block access to resources, knowledge of resources
- Exploit new technology for prevention
- Restrict new technology for terrorism
- Avoid rigidity – crime changes but your security can't
- Lock terrorists into particular approaches, designs
- Future proofing & Pipelines
- Get terrorists to focus effort on here & now solutions

Conclusions

- Brief tour of creativity, design and innovation
- Introduced various frameworks and process models from design, and design against crime, generally as tasters
- Some interesting connections, though keeping track of where we are – design, anti-design, anti-anti design, tricky
- But which, if any, are worth exploring in depth?
- To do so properly, would need close collaboration between those knowledgeable about
  - Innovation, and how to make it succeed
  - Terrorism, and how to make it fail

  And differentiate between boosting legitimate innovation whilst bashing illegitimate innovation - Balance between
  - Top down – trying to inhibit creativity and innovation in general
  - Bottom-up – focusing on specific creativity & innovation challenges terrorists must address, whilst seeking generalizable lessons